GE Healthcare

Vivid S5 N and Vivid S6 N

Service Manual

Part Number: FN091019
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Important Precautions

THIS SERVICE MANUAL IS AVAILABLE IN ENGLISH ONLY.

- **IF A CUSTOMER'S SERVICE PROVIDER REQUIRES A LANGUAGE OTHER THAN ENGLISH, IT IS THE CUSTOMER'S RESPONSIBILITY TO PROVIDE TRANSLATION SERVICES.**

WARNING (EN)

- **DO NOT ATTEMPT TO SERVICE THE EQUIPMENT UNLESS THIS SERVICE MANUAL HAS BEEN CONSULTED AND IS UNDERSTOOD.**
- **FAILURE TO HEED THIS WARNING MAY RESULT IN INJURY TO THE SERVICE PROVIDER, OPERATOR OR PATIENT FROM ELECTRIC SHOCK, MECHANICAL OR OTHER HAZARDS.**

CE MANUEL DE MAINTENANCE N'EST DISPONIBLE QU'EN ANGLAIS.

- **SI LE TECHNICIEN DU CLIENT A BESOIN DE CE MANUEL DANS UNE AUTRE LANGUE QUE L'ANGLAIS, C'EST AU CLIENT QU'IL INCOMBE DE LE FAIRE TRADUIRE.**

AVERTISSEMENT (FR)

- **NE PAS TENTER D'INTERVENTION SUR LES ÉQUIPEMENTS TANT QUE LE MANUEL SERVICE N'A PAS ÉTÉ CONSULTÉ ET COMPRIS.**
- **LE NON-RESPECT DE CET AVERTISSEMENT PEUT ENTRAÎNER CHEZ LE TECHNICIEN, L'OPÉRATEUR OU LE PATIENT DES BLESSURES DUES À DES DANGERS ÉLECTRIQUES, MÉCANIQUES OU AUTRES.**

DIESES KUNDENDIENST-HANDBUCH EXISTIERT NUR IN ENGLISCHER SPRACHE.

- **FALLS EIN FREMDER KUNDENDIENST EINE ANDERE SPRACHE BENÖTIGT, IST ES AUFGABE DES KUNDEN FÜR EINE ENTSPRECHENDE ÜBERSETZUNG ZU SORGEN.**

WARNUNG (DE)

- **VERSUCHEN SIE NICHT, DAS GERÄT ZU REPARIEREN, BEVOR DIESES KUNDENDIENST-HANDBUCH NICHT ZU RATE GEZOGEN UND VERSTANDEN WURDE.**
- **WIRD DIESE WARNUNG NICHT BEACHTET, SO KANN ES ZU VERLETZUNGEN DES KUNDENDIENSTTECHNIKERS, DES BEDIENERS ODER DES PATIENTEN DURCH ELEKTRISCHE SCHLÄGE, MECHANISCHE ODER SONSTIGE GEFAHREN KOMMEN.**

AVISO (ES)

ESTE MANUAL DE SERVICIO SÓLO EXISTE EN INGLÉS.

- **SI ALGÚN PROVEEDOR DE SERVICIOS AJENO A GEHC SOLICITA UN IDIOMA QUE NO SEA EL INGLÉS, ES RESPONSABILIDAD DEL CLIENTE OFRECER UN SERVICIO DE TRADUCCIÓN.**
- **NO SE DEBERÁ DAR SERVICIO TÉCNICO AL EQUIPO, SIN HABER CONSULTADO Y COMPRENDIDO ESTE MANUAL DE SERVICIO.**
- **LA NO OBSERVANCIA DEL PRESENTE AVISO PUEDE DAR LUGAR A QUE EL PROVEEDOR DE SERVICIOS, EL OPERADOR O EL PACIENTE SUFRAN LESIONES PROVOCADAS POR CAUSAS ELÉCTRICAS, MECÁNICAS O DE OTRA NATURALEZA.**

ATENÇÃO (PT)

ESTE MANUAL DE ASSISTÊNCIA TÉCNICA SÓ SE ENCONTRA DISPONÍVEL EM INGLÊS.

- **SE QUALQUER OUTRO SERVIÇO DE ASSISTÊNCIA TÉCNICA, QUE NÃO A GEHC, SOLICITAR ESTES MANUAIS NOUTRO IDIOMA, É DA RESPONSABILIDADE DO CLIENTE FORNECER OS SERVIÇOS DE TRADUÇÃO.**
- **NÃO TENTE REPARAR O EQUIPAMENTO SEM TER CONSULTADO E COMPREENDIDO ESTE MANUAL DE ASSISTÊNCIA TÉCNICA.**
- **O NÃO CUMPRIMENTO DESTE AVISO PODE POR EM PERIGO A SEGURANÇA DO TÉCNICO, OPERADOR OU PACIENTE DEVIDO A' CHOQUES ELÉTRICOS, MECÂNICOS OU OUTROS.**

AVVERTENZA (IT)

IL PRESENTE MANUALE DI MANUTENZIONE È DISPONIBILE SOLTANTO IN INGLESE.

- **SE UN ADDETTO ALLA MANUTENZIONE ESTERNO ALLA GEHC RICHIEDE IL MANUALE IN UNA LINGUA DIVERSA, IL CLIENTE È TENUTO A PROVVEDERE DIRETTAMENTE ALLA TRADUZIONE.**
- **SI PROCEDA ALLA MANUTENZIONE DELL'APPARECCHIATURA SOLO DOPO AVER CONSULTATO IL PRESENTE MANUALE ED AVERNE COMPRESO IL CONTENUTO.**
- **NON TENERE CONTO DELLA PRESENTE AVVERTENZA POTREBBE FAR COMPIERE OPERAZIONI DA CUI DERIVINO LESIONI ALL'ADDETTO ALLA MANUTENZIONE, ALL'UTILIZZATORE ED AL PAZIENTE PER FOLGORAZIONE ELETTRICA, PER URTI MECCANICI OD ALTRI RISCHI.**

HOIATUS (ET)

KÄESOLEV TEENINDUSJUHEND ON SAADAVAL AINULT INGLISE KEELES.

- **KUI KLIENDITEENINDUSE OSUTAJA NÕUAB JUHENDIT INGLISE KEELEST ERINEVAS KEELES, VASTUTAB KLIENT TÕLKETEENUSE OSUTAMISE EEST.**
- **ÄRGE ÜRITAGE SEADMEID TEENINDADA ENNE EELNEVALT KÄESOLEVA TEENINDUSJUHENDIGA TUTVUMIST JA SELLEST ARU SAAMIST.**
- **KÄESOLEVA HOIATUSE EIRAMINE VÕIB PÕHJUSTADA TEENUSEOSUTAJA, OPERAATORI VÕI PATSIENDI VIGASTAMIST ELEKTRILÖÖGI, MEHAANILISE VÕI MUU OHU TAGAJÄRJEL.**

VAROITUS (FI)

TÄMÄ HUOLTO-OHJE ON SAATAVILLA VAIN ENGLANNIKSI.

- **JOS ASIAKKAAN PALVELUNTARJOAJA VAATII MUUTA KUIN ENGLANNINKIELISTÄ MATERIAALIA, TARVITTAVAN KÄÄNNÖKSEN HANKKIMINEN ON ASIAKKAAN VASTUULLA.**
- **ÄLÄ YRITÄ KORJATA LAITTEISTOA ENNEN KUIN OLET VARMASTI LUKENUT JA YMMÄRTÄNYT TÄMÄN HUOLTO-OHJEEN.**
- **MIKÄLI TÄTÄ VAROITUSTA EI NOUDATETA, SEURAUKSENA VOI OLLA PALVELUNTARJOAJAN, LAITTEISTON KÄYTTÄJÄN TAI POTILAAN VAHINGOITTUMINEN SÄHKÖISKUN, MEKAANISEN VIAN TAI MUUN VAARATILANTEEN VUOKSI.**

ΠΡΟΕΙΔΟΠΟΙΗΣΗ (EL)

ΤΟ ΠΑΡΟΝ ΕΓΧΕΙΡΙΔΙΟ ΣΕΡΒΙΣ ΔΙΑΤΙΘΕΤΑΙ ΣΤΑ ΑΓΓΛΙΚΑ ΜΟΝΟ.

- **ΕΑΝ ΤΟ ΑΤΟΜΟ ΠΑΡΟΧΗΣ ΣΕΡΒΙΣ ΕΝΟΣ ΠΕΛΑΤΗ ΑΠΑΙΤΕΙ ΤΟ ΠΑΡΟΝ ΕΓΧΕΙΡΙΔΙΟ ΣΕ ΓΛΩΣΣΑ ΕΚΤΟΣ ΤΩΝ ΑΓΓΛΙΚΩΝ, ΑΠΟΤΕΛΕΙ ΕΥΘΥΝΗ ΤΟΥ ΠΕΛΑΤΗ ΝΑ ΠΑΡΕΧΕΙ ΥΠΗΡΕΣΙΕΣ ΜΕΤΑΦΡΑΣΗΣ.**
- **ΜΗΝ ΕΠΙΧΕΙΡΗΣΕΤΕ ΤΗΝ ΕΚΤΕΛΕΣΗ ΕΡΓΑΣΙΩΝ ΣΕΡΒΙΣ ΣΤΟΝ ΕΞΟΠΛΙΣΜΟ ΕΚΤΟΣ ΕΑΝ ΕΧΕΤΕ ΣΥΜΒΟΥΛΕΥΤΕΙ ΚΑΙ ΕΧΕΤΕ ΚΑΤΑΝΟΗΣΕΙ ΤΟ ΠΑΡΟΝ ΕΓΧΕΙΡΙΔΙΟ ΣΕΡΒΙΣ.**
- **ΕΑΝ ΔΕ ΛΑΒΕΤΕ ΥΠΟΨΗ ΤΗΝ ΠΡΟΕΙΔΟΠΟΙΗΣΗ ΑΥΤΗ, ΕΝΔΕΧΕΤΑΙ ΝΑ ΠΡΟΚΛΗΘΕΙ ΤΡΑΥΜΑΤΙΣΜΟΣ ΣΤΟ ΑΤΟΜΟ ΠΑΡΟΧΗΣ ΣΕΡΒΙΣ, ΣΤΟ ΧΕΙΡΙΣΤΗ Ή ΣΤΟΝ ΑΣΘΕΝΗ ΑΠΟ ΗΛΕΚΤΡΟΠΛΗΞΙΑ, ΜΗΧΑΝΙΚΟΥΣ Ή ΑΛΛΟΥΣ ΚΙΝΔΥΝΟΥΣ.**

FIGYELMEZTETÉS (HU)

EZEN KARBANTARTÁSI KÉZIKÖNYV KIZÁRÓLAG ANGOL NYELVEN ÉRHETŐ EL.

- **HA A VEVŐ SZOLGÁLTATÓJA ANGOLTÓL ELTÉRŐ NYELVRE TART IGÉNYT, AKKOR A VEVŐ FELELŐSSÉGE A FORDÍTÁS ELKÉSZÍTTETÉSE.**
- **NE PRÓBÁLJA ELKEZDENI HASZNÁLNI A BERENDEZÉST, AMÍG A KARBANTARTÁSI KÉZIKÖNYVBEN LEÍRTAKAT NEM ÉRTELMEZTÉK.**
- **EZEN FIGYELMEZTETÉS FIGYELMEN KÍVÜL HAGYÁSA A SZOLGÁLTATÓ, MŰKÖDTETŐ VAGY A BETEG ÁRAMÜTÉS, MECHANIKAI VAGY EGYÉB VESZÉLYHELYZET MIATTI SÉRÜLÉSÉT EREDMÉNYEZHETI.**

VIÐVÖRUN (IS)

ÞESSI ÞJÓNUSTUHANDBÓK ER EINGÖNGU FÁANLEG Á ENSKU.

- **EF ÞJÓNUSTUAÐILI VIÐSKIPTAMANNS ÞARFNAST ANNARS TUNGUMÁLS EN ENSKU, ER ÞAÐ Á ÁBYRGÐ VIÐSKIPTAMANNS AÐ ÚTVEGA ÞÝÐINGU.**
- **REYNIÐ EKKI AÐ ÞJÓNUSTA TÆKIÐ NEMA EFTIR AÐ HAFA SKOÐAÐ OG SKILIÐ ÞESSA ÞJÓNUSTUHANDBÓK.**
- **EF EKKI ER FARIÐ AÐ ÞESSARI VIÐVÖRUN GETUR ÞAÐ VALDIÐ MEIÐSLUM ÞJÓNUSTUVEITANDA, STJÓRNANDA EÐA SJÚKLINGS VEGNA RAFLOSTS, VÉLRÆNNAR EÐA ANNARRAR HÆTTU.**

VÝSTRAHA (CS)

TENTO SERVISNÍ NÁVOD EXISTUJE POUZE V ANGLICKÉM JAZYCE.

- **V PŘÍPADĚ, ŽE POSKYTOVATEL SLUŽEB ZÁKAZNÍKŮM POTŘEBUJE NÁVOD V JINÉM JAZYCE, JE ZAJIŠTĚNÍ PŘEKLADU DO ODPOVÍDAJÍCÍHO JAZYKA ÚKOLEM ZÁKAZNÍKA.**
- **NEPROVÁDĚJTE ÚDRŽBU TOHOTO ZAŘÍZENÍ, ANIŽ BYSTE SI PŘEČETLI TENTO SERVISNÍ NÁVOD A POCHOPILI JEHO OBSAH.**
- **V PŘÍPADĚ NEDODRŽOVÁNÍ TÉTO VÝSTRAHY MŮŽE DOJÍT ÚRAZU ELEKTRICKÁM PROUDEM PRACOVNÍKA POSKYTOVATELE SLUŽEB, OBSLUŽNÉHO PERSONÁLU NEBO PACIENTŮ VLIVEM ELEKTRICKÉHOP PROUDU, RESPEKTIVE VLIVEM K RIZIKU MECHANICKÉHO POŠKOZENÍ NEBO JINÉMU RIZIKU.**

ADVARSEL (DA)

DENNE SERVICEMANUAL FINDES KUN PÅ ENGELSK.

- **HVIS EN KUNDES TEKNIKER HAR BRUG FOR ET ANDET SPROG END ENGELSK, ER DET KUNDENS ANSVAR AT SØRGE FOR OVERSÆTTELSE.**
- **FORSØG IKKE AT SERVICERE UDSTYRET MEDMINDRE DENNE SERVICEMANUAL ER BLEVET LÆST OG FORSTÅET.**
- **MANGLENDE OVERHOLDELSE AF DENNE ADVARSEL KAN MEDFØRE SKADE PÅ GRUND AF ELEKTRISK, MEKANISK ELLER ANDEN FARE FOR TEKNIKEREN, OPERATØREN ELLER PATIENTEN.**

WAARSCHUWING (NL)

DEZE ONDERHOUDSHANDLEIDING IS ENKEL IN HET ENGELS VERKRIJGBAAR.

- **ALS HET ONDERHOUDSPERSONEEL EEN ANDERE TAAL VEREIST, DAN IS DE KLANT VERANTWOORDELIJK VOOR DE VERTALING ERVAN.**
- **PROBEER DE APPARATUUR NIET TE ONDERHOUDEN VOORDAT DEZE ONDERHOUDSHANDLEIDING WERD GERAADPLEEGD EN BEGREPEN IS.**
- **INDIEN DEZE WAARSCHUWING NIET WORDT OPGEVOLGD, ZOU HET ONDERHOUDSPERSONEEL, DE OPERATOR OF EEN PATIËNT GEWOND KUNNEN RAKEN ALS GEVOLG VAN EEN ELEKTRISCHE SCHOK, MECHANISCHE OF ANDERE GEVAREN.**

BRĪDINĀJUMS (LV)

ŠĪ APKALPES ROKASGRĀMATA IR PIEEJAMA TIKAI ANGĻU VALODĀ.

- **JA KLIENTA APKALPES SNIEDZĒJAM NEPIECIEŠAMA INFORMĀCIJA CITĀ VALODĀ, NEVIS ANGĻU, KLIENTA PIENĀKUMS IR NODROŠINĀT TULKOŠANU.**
- **NEVEICIET APRĪKOJUMA APKALPI BEZ APKALPES ROKASGRĀMATAS IZLASĪŠANAS UN SAPRAŠANAS.**
- **ŠĪ BRĪDINĀJUMA NEIEVĒROŠANA VAR RADĪT ELEKTRISKĀS STRĀVAS TRIECIENA, MEHĀNISKU VAI CITU RISKU IZRAISĪTU TRAUMU APKALPES SNIEDZĒJAM, OPERATORAM VAI PACIENTAM.**

ŠIS EKSPLOATAVIMO VADOVAS YRA IŠLEISTAS TIK ANGLŲ KALBA.

- **JEI KLIENTO PASLAUGŲ TEIKĖJUI REIKIA VADOVO KITA KALBA – NE ANGLŲ, VERTIMU PASIRŪPINTI TURI KLIENTAS.**

ĮSPĖJIMAS (LT)

- **NEMĖGINKITE ATLIKTI ĮRANGOS TECHNINĖS PRIEŽIŪROS DARBŲ, NEBENT VADOVAUTUMĖTĖS ŠIUO EKSPLOATAVIMO VADOVU IR JĮ SUPRASTUMĖTE**
- **NEPAISANT ŠIO PERSPĖJIMO, PASLAUGŲ TEIKĖJAS, OPERATORIUS AR PACIENTAS GALI BŪTI SUŽEISTAS DĖL ELEKTROS SMŪGIO, MECHANINIŲ AR KITŲ PAVOJŲ.**

DENNE SERVICEHÅNDBOKEN FINNES BARE PÅ ENGELSK.

- **HVIS KUNDENS SERVICELEVERANDØR TRENGER ET ANNET SPRÅK, ER DET KUNDENS ANSVAR Å SØRGE FOR OVERSETTELSE.**

ADVARSEL (NO)

- **IKKE FORSØK Å REPARERE UTSTYRET UTEN AT DENNE SERVICEHÅNDBOKEN ER LEST OG FORSTÅTT.**
- **MANGLENDE HENSYN TIL DENNE ADVARSELEN KAN FØRE TIL AT SERVICELEVERANDØREN, OPERATØREN ELLER PASIENTEN SKADES PÅ GRUNN AV ELEKTRISK STØT, MEKANISKE ELLER ANDRE FARER.**

NINIEJSZY PODRĘCZNIK SERWISOWY DOSTĘPNY JEST JEDYNIE W JĘZYKU ANGIELSKIM.

- **JEŚLI FIRMA ŚWIADCZĄCA KLIENTOWI USŁUGI SERWISOWE WYMAGA UDOSTĘPNIENIA PODRĘCZNIKA W JĘZYKU INNYM NIŻ ANGIELSKI, OBOWIĄZEK ZAPEWNIENIA STOSOWNEGO TŁUMACZENIA SPOCZYWA NA KLIENCIE.**

OSTRZEŻENIE (PL)

- **NIE PRÓBOWAĆ SERWISOWAĆ NINIEJSZEGO SPRZĘTU BEZ UPRZEDNIEGO ZAPOZNANIA SIĘ Z PODRĘCZNIKIEM SERWISOWYM.**
- **NIEZASTOSOWANIE SIĘ DO TEGO OSTRZEŻENIA MOżE GROZIĆ OBRAŻENIAMI CIAŁA SERWISANTA, OPERATORA LUB PACJENTA W WYNIKU PORAŻENIA PRĄDEM, URAZU MECHANICZNEGO LUB INNEGO RODZAJU ZAGROŻEŃ.**

ACEST MANUAL DE SERVICE ESTE DISPONIBIL NUMAI ÎN LIMBA ENGLEZĂ.

- **DACĂ UN FURNIZOR DE SERVICII PENTRU CLIENȚI NECESITĂ O ALTĂ LIMBĂ DECÂT CEA ENGLEZĂ, ESTE DE DATORIA CLIENTULUI SĂ FURNIZEZE O TRADUCERE.**

ATENȚIE (RO)

- **NU ÎNCERCAȚI SĂ REPARAȚI ECHIPAMENTUL DECÂT ULTERIOR CONSULTĂRII ŞI ÎNȚELEGERII ACESTUI MANUAL DE SERVICE.**
- **IGNORAREA ACESTUI AVERTISMENT AR PUTEA DUCE LA RĂNIREA DEPANATORULUI, OPERATORULUI SAU PACIENTULUI ÎN URMA PERICOLELOR DE ELECTROCUTARE, MECANICE SAU DE ALTĂ NATURĂ.**

ДАННОЕ РУКОВОДСТВО ПО ОБСЛУЖИВАНИЮ ПРЕДОСТАВЛЯЕТСЯ ТОЛЬКО НА АНГЛИЙСКОМ ЯЗЫКЕ.

- **ЕСЛИ СЕРВИСНОМУ ПЕРСОНАЛУ КЛИЕНТА НЕОБХОДИМО РУКОВОДСТВО НЕ НА АНГЛИЙСКОМ ЯЗЫКЕ, КЛИЕНТУ СЛЕДУЕТ САМОСТОЯТЕЛЬНО ОБЕСПЕЧИТЬ ПЕРЕВОД.**

ОСТОРОЖНО! (RU)

- **ПЕРЕД ОБСЛУЖИВАНИЕМ ОБОРУДОВАНИЯ ОБЯЗАТЕЛЬНО ОБРАТИТЕСЬ К ДАННОМУ РУКОВОДСТВУ И ПОЙМИТЕ ИЗЛОЖЕННЫЕ В НЕМ СВЕДЕНИЯ.**
- **НЕСОБЛЮДЕНИЕ УКАЗАННЫХ ТРЕБОВАНИЙ МОЖЕТ ПРИВЕСТИ К ТОМУ, ЧТО СПЕЦИАЛИСТ ПО ТЕХОБСЛУЖИВАНИЮ, ОПЕРАТОР ИЛИ ПАЦИЕНТ ПОЛУЧАТ УДАР ЭЛЕКТРИЧЕСКИМ ТОКОМ, МЕХАНИЧЕСКУЮ ТРАВМУ ИЛИ ДРУГОЕ ПОВРЕЖДЕНИЕ.**

TÁTO SERVISNÁ PRÍRUČKA JE K DISPOZÍCII LEN V ANGLIČTINE.

- **AK ZÁKAZNÍKOV POSKYTOVATEĽ SLUŽIEB VYŽADUJE INÝ JAZYK AKO ANGLIČTINU, POSKYTNUTIE PREKLADATEĽSKÝCH SLUŽIEB JE ZODPOVEDNOSŤOU ZÁKAZNÍKA.**

UPOZORNENIE (SK)

- **NEPOKÚŠAJTE SA VYKONÁVAŤ SERVIS ZARIADENIA SKÔR, AKO SI NEPREČÍTATE SERVISNÚ PRÍRUČKU A NEPOROZUMIETE JEJ.**
- **ZANEDBANIE TOHTO UPOZORNENIA MÔŽE VYÚSTIŤ DO ZRANENIA POSKYTOVATEĽA SLUŽIEB, OBSLUHUJÚCEJ OSOBY ALEBO PACIENTA ELEKTRICKÝM PRÚDOM, PRÍPADNE DO MECHANICKÉHO ALEBO INÉHO NEBEZPEČENSTVA.**

DEN HÄR SERVICEHANDBOKEN FINNS BARA TILLGÄNGLIG PÅ ENGELSKA.

- **OM EN KUNDS SERVICETEKNIKER HAR BEHOV AV ETT ANNAT SPRÅK ÄN ENGELSKA ANSVARAR KUNDEN FÖR ATT TILLHANDAHÅLLA ÖVERSÄTTNINGSTJÄNSTER.**

VARNING (SV)

- **FÖRSÖK INTE UTFÖRA SERVICE PÅ UTRUSTNINGEN OM DU INTE HAR LÄST OCH FÖRSTÅR DEN HÄR SERVICEHANDBOKEN.**
- **OM DU INTE TAR HÄNSYN TILL DEN HÄR VARNINGEN KAN DET RESULTERA I SKADOR PÅ SERVICETEKNIKERN, OPERATÖREN ELLER PATIENTEN TILL FÖLJD AV ELEKTRISKA STÖTAR, MEKANISKA FAROR ELLER ANDRA FAROR.**

BU SERVİS KILAVUZU YALNIZCA İNGİLİZCE OLARAK SAĞLANMIŞTIR.

- **EĞER MÜŞTERİ TEKNİSYENİ KILAVUZUN İNGİLİZCE DIŞINDAKİ BİR DİLDE OLMASINI İSTERSE, KILAVUZU TERCÜME ETTİRMEK MÜŞTERİNİN SORUMLULUĞUNDADIR.**

DİKKAT (TR)

- **SERVİS KILAVUZUNU OKUYUP ANLAMADAN EKİPMANLARA MÜDAHALE ETMEYİNİZ.**
- **BU UYARININ GÖZ ARDI EDİLMESİ, ELEKTRİK ÇARPMASI YA DA MEKANİK VEYA DİĞER TÜRDEN KAZALAR SONUCUNDA TEKNİSYENİN, OPERATÖRÜN YA DA HASTANIN YARALANMASINA YOL AÇABİLİR.**

警告
(JA)

このサービスマニュアルには英語版しかありません。
GEHC 以外でサービスを担当される業者が英語以外の言語を要求される場合、翻訳作業はその業者の責任で行うものとさせていただきます。
このサービスマニュアルを熟読し理解せずに、装置のサービスを行わないで下さい。
この警告に従わない場合、サービスを担当される方、操作員あるいは患者さんが、感電や機械的又はその他の危険により負傷する可能性があります。

注意:
(ZH-CN)

本维修手册仅存有英文本。
非 GEHC 公司的维修员要求非英文本的维修手册时，客户需自行负责翻译。
未详细阅读和完全了解本手册之前，不得进行维修。
忽略本注意事项会对维修员，操作员或病人造成触电，机械伤害或其他伤害。

경고
(KO)

- 본 서비스 지침서는 영어로만 이용하실 수 있습니다.
- 고객의 서비스 제공자가 영어이외 언어를 요구할 경우, 번역 서비스 지침서를 제공하는 것은 고객의 책임입니다.
- 본 서비스 지침서를 지참했고 이해하지 않는 한은 해당 장비를 수리를 시도하지 마십시오.
- 이 경우에 유해하지 않은 진기쇼크, 기계상의 혹은 다른 위험으로부터 서비스 제공자, 운영자 혹은 환자에게 위험을 가할 수 있습니다.

DAMAGE IN TRANSPORTATION

All packages should be closely examined at time of delivery. If damage is apparent write “Damage In Shipment” on ALL copies of the freight or express bill BEFORE delivery is accepted or “signed for” by a GE representative or hospital receiving agent. Whether noted or concealed, damage MUST be reported to the carrier immediately upon discovery, or in any event, within 14 days after receipt, and the contents and containers held for inspection by the carrier. A transportation company will not pay a claim for damage if an inspection is not requested within this 14 day period.

CERTIFIED ELECTRICAL CONTRACTOR STATEMENT - FOR USA ONLY

All electrical Installations that are preliminary to positioning of the equipment at the site prepared for the equipment shall be performed by licensed electrical contractors. Other connections between pieces of electrical equipment, calibrations and testing shall be performed by qualified GE Healthcare personnel. In performing all electrical work on these products, GE will use its own specially trained field engineers. All of GE’s electrical work on these products will comply with the requirements of the applicable electrical codes.

The purchaser of GE equipment shall only utilize qualified personnel (i.e., GE’s field engineers, personnel of third-party service companies with equivalent training, or licensed electricians) to perform electrical servicing on the equipment.

OMISSIONS & ERRORS

If there are any omissions, errors or suggestions for improving this documentation, please contact the GE Healthcare Global Documentation Group with specific information listing the system type, manual title, part number, revision number, page number and suggestion details.

Mail the information to:

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NORWAY

SERVICE SAFETY CONSIDERATIONS

DANGER **DANGEROUS VOLTAGES, CAPABLE OF CAUSING DEATH, ARE PRESENT IN THIS EQUIPMENT. USE EXTREME CAUTION WHEN HANDLING, TESTING AND ADJUSTING.**

WARNING ***Use all Personal Protection Equipment (PPE) such as gloves, safety shoes, safety glasses, and kneeling pad, to reduce the risk of injury.***

For a complete review of all safety requirements, see Section 1-3 "Safety Considerations" on page 1-7.

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2-1 to 2-12	2	8-1 to 8-222	2		
3-1 to 3-170	2	9-1 to 9-18	2		

CHAPTER 1
Introduction

Overview . . . . . 1 - 1
Purpose of Chapter 1 . . . . . 1 - 1
Purpose of Service Manual . . . . . 1 - 2
Typical Users of the Service Manual . . . . . 1 - 2
Vivid S5 N and Vivid S6 N Models Covered in this Manual . . . . . 1 - 3
System History - Hardware and Software Versions . . . . . 1 - 4
Purpose of Operator Manual(s) . . . . . 1 - 4

Important Conventions . . . . . 1 - 5
Conventions Used in this Manual . . . . . 1 - 5

Safety Considerations . . . . . 1 - 7
Introduction . . . . . 1 - 7
Human Safety . . . . . 1 - 7
Mechanical Safety . . . . . 1 - 7
Electrical Safety . . . . . 1 - 8
Dangerous Procedure Warnings . . . . . 1 - 9

Product Labels and Icons . . . . . 1 - 10
Product Rating Plate Locations . . . . . 1 - 10
Label Descriptions . . . . . 1 - 12
Vivid S6 N Battery Safety . . . . . 1 - 14
Vivid S5 N and Vivid S6 N External Labels . . . . . 1 - 16

EMC, EMI, and ESD . . . . . 1 - 17
Electromagnetic Compatibility (EMC) . . . . . 1 - 17
CE Compliance . . . . . 1 - 17
Electrostatic Discharge (ESD) Prevention . . . . . 1 - 17
Standards Used . . . . . 1 - 18
Lockout/Tagout Requirements (For USA Only) . . . . . 1 - 18

Customer Assistance . . . . . 1 - 19
Contact Information . . . . . 1 - 19
System manufacturer . . . . . 1 - 20

CHAPTER 2
Site Preparations

Overview . . . . . 2 - 1
Purpose of Chapter 2 . . . . . 2 - 1

Console Requirements . . . . . 2 - 2
Unit Environmental Requirements . . . . . 2 - 2
Cooling Requirements . . . . . 2 - 2
Lighting Requirements . . . . . 2 - 2
Time and Manpower Requirements . . . . . 2 - 2
Electrical Requirements . . . . . 2 - 3
EMI Limitations . . . . . 2 - 4
Probe Environmental Requirements . . . . . 2 - 5

Facility Needs . . . . . 2 - 6
Purchaser Responsibilities . . . . . 2 - 6
Mandatory Site Requirements . . . . . 2 - 7
Site Recommendations . . . . . 2 - 7
Networking Pre-Installation Requirements . . . . . 2 - 9

Connectivity Installation Worksheet . . . . . 2 - 10

CHAPTER 3
System Setup

Overview . . . . . 3 - 1
Purpose of Chapter 3 . . . . . 3 - 1

Installation Reminders . . . . . 3 - 2
Average Installation Time . . . . . 3 - 2
Installation Warnings . . . . . 3 - 2
Safety Reminders . . . . . 3 - 3

Receiving and Unpacking the Equipment . . . . . 3 - 4
Unpacking the Cardboard Shipping Carton . . . . . 3 - 8
Verifying the Shipping Carton Contents . . . . . 3 - 13
Physical Inspection . . . . . 3 - 13
EMI Protection . . . . . 3 - 13

Preparing for Installation . . . . . 3 - 14
Confirming Customer Order . . . . . 3 - 14
Verifying the Shipping Carton Contents . . . . . 3 - 14
Component Inspection . . . . . 3 - 15
System Voltage Confirmation . . . . . 3 - 21
Ensuring Protection from EMI . . . . . 3 - 22

Completing the Hardware Installation . . . . . 3 - 23
Connecting Peripherals . . . . . 3 - 23
Connecting Probes . . . . . 3 - 52
Connecting the ECG . . . . . 3 - 55
Connecting the Unit to a Power Source . . . . . 3 - 57
Switching the System ON/OFF . . . . . 3 - 60

Configuration . . . . . 3 - 61
Overview . . . . . 3 - 61
Vivid S5 N and Vivid S6 N Configuration . . . . . 3 - 62
Service Screen Set-up . . . . . 3 - 66
Configuring Peripherals . . . . . 3 - 73
Software Options Configuration . . . . . 3 - 76

Connectivity Setup . . . . . 3 - 78
Connectivity Introduction . . . . . 3 - 78
Physical Connection . . . . . 3 - 81
Connectivity Configuration . . . . . 3 - 87
Set Up Connection to a DICOM Server in a Network . . . . . 3 - 98

Setup Connection to HL7 Server in a Network . . . . . 3 - 103
Query/Retrieve (Q/R) Setup . . . . . 3 - 107
MPEGVue Export Configuration . . . . . 3 - 113
eVue Dataflow Configuration . . . . . 3 - 118
Using MPEGVue/eVue on a Remote PC . . . . . 3 - 122

Storing and Transporting the Unit . . . . . 3 - 167
Safety Precautions for Moving the Vivid S5 N or Vivid S6 N Unit . . . . . 3 - 167
Cardboard Shipping Carton and Packaging Materials . . . . . 3 - 167

Completing the Installation Paperwork . . . . . 3 - 168
System Installation Details . . . . . 3 - 168
Product Locator Installation . . . . . 3 - 169
User Manual(s) . . . . . 3 - 169

CHAPTER 4
Functional Checks

Overview . . . . . 4 - 1
Purpose of Chapter 4 . . . . . 4 - 1
Specific Equipment Required . . . . . 4 - 1

General Procedures . . . . . 4 - 2
Overview . . . . . 4 - 2
Power ON/Boot-up . . . . . 4 - 2
Power Shut Down . . . . . 4 - 7
Log On to the System as ADM . . . . . 4 - 10
Using Removable Media . . . . . 4 - 12
Labeling Removable Media . . . . . 4 - 14
Formatting Removable Media . . . . . 4 - 14
DICOM Repair of Removable Media . . . . . 4 - 14
Archiving and Restoring System Configuration . . . . . 4 - 14

Functional Checks . . . . . 4 - 17
Basic Controls . . . . . 4 - 17
Peripherals . . . . . 4 - 32
Mechanical Functional Tests . . . . . 4 - 33
Back End Processor Tests . . . . . 4 - 35

System Turnover Checklist . . . . . 4 - 36
Software Configuration Checks . . . . . 4 - 36

Site Log . . . . . 4 - 37

CHAPTER 5
Components and Function (Theory)

Overview . . . . . 5 - 1
Purpose of Chapter 5 . . . . . 5 - 1

General Information . . . . . 5 - 1
Introduction . . . . . 5 - 2
Signal Flow . . . . . 5 - 3
Vivid S5 N and Vivid S6 N Systems - Block Diagram . . . . . 5 - 4

Front End Unit . . . . . 5 - 5
General Information . . . . . 5 - 5
Front End Unit - Location in the System . . . . . 5 - 8
RFI_AM Board . . . . . 5 - 10
TR32 Boards (Transmitter/Receiver) . . . . . 5 - 14
Probe Select Board (PSB) . . . . . 5 - 17
Probe Interface Board (PIB) . . . . . 5 - 19

Back End Processor . . . . . 5 - 22
Introduction . . . . . 5 - 22
ETX SBC Central Processing Unit (CPU) . . . . . 5 - 24
ETX Base Board . . . . . 5 - 24
Hard Disk . . . . . 5 - 25
Fan Control . . . . . 5 - 26
Temperature Control . . . . . 5 - 26
RTC Battery . . . . . 5 - 26
Back End Processor - Location of Components . . . . . 5 - 27

Internal and External Input/Output (I/O) . . . . . 5 - 30
DIB - Interconnections . . . . . 5 - 33

Power Supply System . . . . . 5 - 36
Electrical Power . . . . . 5 - 36
Introduction . . . . . 5 - 36
AC Distribution Panel . . . . . 5 - 37
Power Supply Unit Components . . . . . 5 - 39
DC Source Selector . . . . . 5 - 39
Rechargeable Battery Pack Assy (GPA) . . . . . 5 - 40

Top Console with Monitor and Operator Panel . . . . . 5 - 42
Keyboard and Operator Panel . . . . . 5 - 42
Keyboard and Operator Panel Components . . . . . 5 - 43

ECG Module . . . . . 5 - 47
Overview . . . . . 5 - 47
ECG Patient I/O Module Specifications . . . . . 5 - 48
Isolation . . . . . 5 - 48

Peripherals . . . . . 5 - 49
Introduction . . . . . 5 - 49

Cooling System . . . . . 5 - 51
General Information . . . . . 5 - 51

Common Service Platform . . . . . 5 - 52
Introduction . . . . . 5 - 52
Global Service User Interface (GSUI) . . . . . 5 - 52

CHAPTER 6
Service Adjustments

Overview . . . . . 6 - 1
Purpose of Chapter 6 . . . . . 6 - 1
LCD Display Adjustments and Calibration . . . . . 6 - 1
Keyboard Adjustments . . . . . 6 - 8
Trackball Speed Setting . . . . . 6 - 8
Beamformer Calibration . . . . . 6 - 9

CHAPTER 7
Diagnostics/Troubleshooting

Overview . . . . . 7 - 1
Purpose of Chapter . . . . . 7 - 1

Diagnostics . . . . . 7 - 2
Diagnostic Tools . . . . . 7 - 2
Diagnostic Procedure Summary . . . . . 7 - 2
Accessing the Diagnostic Test Window . . . . . 7 - 3
Diagnostic Test Window Menu Options . . . . . 7 - 9

Performing Full System Diagnostics . . . . . 7 - 18
Accessing the Full System Diagnostic Options . . . . . 7 - 19

Performing Front End (FE) Diagnostics . . . . . 7 - 23
Accessing the Front End Diagnostic Options . . . . . 7 - 24
Calibration Tests . . . . . 7 - 24
Radio Frequency Interface (RFI) Diagnostic Tests . . . . . 7 - 30
TR 32 Diagnostic Tests . . . . . 7 - 44
Probe Interface Board Diagnostic Tests . . . . . 7 - 59
Probe Select Board Diagnostic Tests . . . . . 7 - 60

Monitoring Tests . . . . . 7 - 86
Accessing the Monitoring Diagnostic Test Options . . . . . 7 - 86

Performing Back End Diagnostics on the System . . . . . 7 - 108
Accessing the Back End Diagnostic Test Options . . . . . 7 - 108

Automatic Error Log . . . . . 7 - 127
Adding Bookmarks . . . . . 7 - 127
Extracting Logs . . . . . 7 - 127

CHAPTER 8
Replacement Procedures

Overview . . . . . 8 - 1
Purpose of Chapter 8 . . . . . 8 - 1

Cover Replacement Procedures . . . . . 8 - 2
Overview of Covers . . . . . 8 - 2
Right Side Cover Replacement Procedure . . . . . 8 - 4
Left Side Cover Replacement Procedure . . . . . 8 - 6
Right Rear Cover Replacement Procedures . . . . . 8 - 10
Left Rear Cover Replacement Procedures . . . . . 8 - 13
Front Cover Replacement Procedures . . . . . 8 - 16
Basket Replacement Procedure . . . . . 8 - 19
Tray Replacement Procedure . . . . . 8 - 20
Bottom Rear Cover Replacement Procedures . . . . . 8 - 21
DVD Cover Replacement Procedure . . . . . 8 - 22

Control Console Components Replacement Procedures . . . . . 8 - 24
Monitor Replacement Procedure . . . . . 8 - 24
Monitor Arm Replacement Procedure . . . . . 8 - 28
Monitor Cover Replacement Procedure . . . . . 8 - 35
Keyboard Assembly Replacement Procedure . . . . . 8 - 37
Keyboard Interface Assembly Replacement Procedure . . . . . 8 - 42
Probe Shelf Replacement Procedure . . . . . 8 - 50
Swivel and Up-Down Handle Replacement Procedure . . . . . 8 - 51
Rear Handle Replacement Procedure . . . . . 8 - 54

Keyboard Assembly Replacement Procedures . . . . . 8 - 57
Keyboard Bottom Cover Replacement Procedure . . . . . 8 - 57
Upper Arm Replacement Procedure . . . . . 8 - 59
Joint Assembly Replacement Procedure . . . . . 8 - 64
Alphanumeric Keyboard Replacement Procedure . . . . . 8 - 67
Trackball Board Replacement Procedure . . . . . 8 - 69
TGC Board Replacement Procedure . . . . . 8 - 71
Extended Keyboard Replacement Procedure . . . . . 8 - 73
LEDs and Soft Menu Board Replacement Procedure . . . . . 8 - 77
Alphanumeric Keycap Replacement Procedure . . . . . 8 - 79
Rotary Knob Replacement Procedure . . . . . 8 - 80
ATGC Keycap Replacement Procedure . . . . . 8 - 81
Speaker Replacement Procedure . . . . . 8 - 82

Cable Replacement Procedures. . . . . 8 - 84
Keyboard and Monitor Cable Replacement Procedure . . . . . 8 - 84

Lower Section Components Replacement Procedures . . . . . 8 - 98
Opening and Removing the Cabinet Cage Assembly . . . . . 8 - 98
Battery Replacement Procedure . . . . . 8 - 106
Battery Bracket Replacement Procedure . . . . . 8 - 109
Hard Disk Replacement Procedure . . . . . 8 - 112
BEP Replacement Procedure . . . . . 8 - 115
ECG Module Assembly Replacement Procedure . . . . . 8 - 121
DC-to-DC Power Supply Replacement Procedure . . . . . 8 - 126
PSB (Probe Select Board) Board Replacement Procedure . . . . . 8 - 129
PIB (Probe Interface Board) Board Replacement Procedure . . . . . 8 - 134
TR32 and RFI Boards Replacement Procedure . . . . . 8 - 137
Fans and Fan Board Replacement Procedure . . . . . 8 - 144
Peripherals AC Outlet Connectors Panel Replacement Procedure . . . . . 8 - 147
Sub-woofer Assembly Replacement Procedure . . . . . 8 - 149
DIB (Distribution Interface Board) Replacement Procedure . . . . . 8 - 152
AC Distribution Box Replacement Procedure . . . . . 8 - 155

Mechanical Components Replacement Procedures . . . . . 8 - 159
Foot Rest Replacement Procedure . . . . . 8 - 159
Brake and Swivel Locking Wheels Replacement Procedure . . . . . 8 - 161
Lower Arm Replacement Procedure . . . . . 8 - 163
Gas Spring Replacement Procedure . . . . . 8 - 169

Software Loading . . . . . 8 - 174
Software Installation/Upgrade Procedure Overview . . . . . 8 - 174
Setting the BIOS . . . . . 8 - 179
BIOS Firmware Update . . . . . 8 - 181
Formatting and Partitioning the Hard Disk - Automatic Procedure . . . . . 8 - 184
Formatting and Partitioning the Hard Disk - Manual Procedure . . . . . 8 - 186
Installing Software only from DVD . . . . . 8 - 190
Installing Software only or Patch . . . . . 8 - 195
Installation of PMC Version . . . . . 8 - 196
Performing a Complete System Back-up . . . . . 8 - 200
Database Merge . . . . . 8 - 200
How to Restore User-defined Presets . . . . . 8 - 204

Peripherals - Replacement Procedures . . . . . 8 - 205
Wireless USB Network Adaptor Replacement Procedure . . . . . 8 - 205
DVD/CD-RW Drive Replacement Procedure . . . . . 8 - 207
MOD Drive Replacement Procedure . . . . . 8 - 211

Black and White Printer Replacement Procedure . . . . . 8 - 213
Peripherals Console Replacement Procedure . . . . . 8 - 216
Digital Color Printer Replacement Procedure . . . . . 8 - 219
DeskJet Color Printer Replacement Procedure . . . . . 8 - 221

CHAPTER 9
Renewal Parts

Overview . . . . . 9 - 1
Purpose of Chapter 9 . . . . . 9 - 1

List of Abbreviations . . . . . 9 - 2

Renewal Parts Lists and Diagrams . . . . . 9 - 3
Covers . . . . . 9 - 3
Mechanical Hardware Parts . . . . . 9 - 5
Electro Mechanical Parts . . . . . 9 - 7
Electronic Parts . . . . . 9 - 8
Cables . . . . . 9 - 11
Software . . . . . 9 - 15
Probes . . . . . 9 - 16

Peripherals . . . . . 9 - 18

CHAPTER 10
Care and Maintenance

Overview . . . . . 10 - 1
Periodic Maintenance Inspections . . . . . 10 - 1
Purpose of Chapter 10 . . . . . 10 - 1
Warnings . . . . . 10 - 2

Why Perform Maintenance Procedures? . . . . . 10 - 3
Keeping Records . . . . . 10 - 3
Quality Assurance . . . . . 10 - 3

Maintenance Task Schedule . . . . . 10 - 4
How Often Should Care & Maintenance Procedures be Performed? . . . . . 10 - 4
Special Tools, Supplies and Equipment . . . . . 10 - 6

System Maintenance . . . . . 10 - 7
Preliminary Checks . . . . . 10 - 7
Functional Checks . . . . . 10 - 8
Input Power Checks . . . . . 10 - 9
Cleaning . . . . . 10 - 10
Physical Inspection . . . . . 10 - 13
Optional Diagnostic Checks . . . . . 10 - 14

Probe Maintenance . . . . . 10 - 15
Probe Checks . . . . . 10 - 15
Probe Handling . . . . . 10 - 15
Basic Probe Care . . . . . 10 - 16
Probe Cleaning . . . . . 10 - 16
Returning and Shipping of Defective Probes . . . . . 10 - 19

Electrical Safety Tests . . . . . 10 - 20
Safety Test Overview . . . . . 10 - 20
GE Current Leakage Limits . . . . . 10 - 21
Outlet Test Wiring Arrangement - USA & Canada . . . . . 10 - 22
Grounding Continuity . . . . . 10 - 23
Chassis Current Leakage Test . . . . . 10 - 24
Isolated Patient Lead (Source) Leakage – Lead-to-Ground . . . . . 10 - 26
Isolated Patient Lead (Source) Leakage – Lead-to-Lead . . . . . 10 - 27
Isolated Patient Lead (Sink) Leakage - Isolation Test . . . . . 10 - 27
Probe Current Leakage Test . . . . . 10 - 29

Excessive Current Leakage . . . . . 10 - 32

Possible Causes of Excessive Current Leakage . . . . . 10 - 32

Vivid S5 N and Vivid S6 N Inspection Certificates . . . . . 10 - 33

Chapter 1
Introduction

Section 1-1
Overview

1-1-1 Purpose of Chapter 1

This chapter describes important issues related to safely servicing the Vivid S5 N and Vivid S6 N ultrasound scanner. The service provider must read and understand all the information presented here before installing or servicing a unit.

Table 1-1 Contents in Chapter 1

Section	Description	Page Number
1-1	Overview	1-1
1-2	Important Conventions	1-5
1-3	Safety Considerations	1-7
1-4	Product Labels and Icons	1-10
1-5	EMC, EMI, and ESD	1-17
1-6	Customer Assistance	1-19

1-1-2 Purpose of Service Manual

This manual provides installation and service information for the Vivid S5 N and Vivid S6 N ultrasound scanners, and contains the following chapters:

- *Chapter 1* - Introduction
  Contains a content summary and warnings.
- *Chapter 2* - Site Preparations
  Contains pre-installation requirements for the Vivid S5 N and Vivid S6 N ultrasound scanner.
- *Chapter 3* - System Setup
  Contains installation procedures and an installation checklist.
- *Chapter 4* - Functional Checks
  Contains functional checks that are recommended as part of the installation procedure, or as required during servicing and periodic maintenance.
- *Chapter 5* - Components and Function (Theory)
  Contains block diagrams and functional explanations of the electronic circuits.
- *Chapter 6* - Service Adjustments
  Contains instructions for performing service adjustments to the Vivid S5 N and Vivid S6 N ultrasound scanner.
- *Chapter 7* - Diagnostics/Troubleshooting
  Provides instructions for setting up and running diagnostic, troubleshooting and other related routines for the Vivid S5 N and Vivid S6 N ultrasound scanner.
- *Chapter 8* - Replacement Procedures
  Provides disassembly and reassembly procedures for all Field Replaceable Units (FRUs).
- *Chapter 9* - Renewal Parts
  Contains a complete list of field replaceable parts for the Vivid S5 N and Vivid S6 N ultrasound scanner.
- *Chapter 10* - Care and Maintenance
  Provides periodic maintenance procedures for the Vivid S5 N and Vivid S6 N ultrasound scanner.

1-1-3 Typical Users of the Service Manual

This manual is intended for the following categories of users:

- GE service personnel (installation, maintenance, etc.).
- Hospital service personnel.
- Contractors (some parts of *Chapter 2* - Site Preparations).

1-1-4 Vivid S5 N and Vivid S6 N Models Covered in this Manual

The Vivid S5 N and Vivid S6 N models documented in this manual are shown in Table 1-2 below.

Table 1-2 Vivid S5 N and Vivid S6 N Models and Hardware/Software Compatibility

CAT NO.	MODEL NUMBER	DESCRIPTION	SYSTEM SOFTWARE VERSION(S)	APPLICATION SOFTWARE VERSION(S)
Vivid S5 N				
H45561HE	FN000060	Introduced 2010	v3.0.10	v10.1.1 build 101 v10.1.0 build 65
H45561FE	FN000040	Introduced 2009	v2.0.8	v7.2.0.Build 100
H45551WC	FN000010	Introduced 2008		
Vivid S6 N				
H45561HF	FN000070	Introduced 2010	v3.0.10	v10.1.1 build 101 v10.1.0 build 65
H45561FF	FN000050	Introduced 2009	v2.0.8	v7.2.0.Build 100
H45551WB	FN000020	Introduced 2008		

1-1-5 System History - Hardware and Software Versions

The Vivid S5 N and Vivid S6 N is a compact, phased, linear array ultrasound imaging scanner. Weighing only 65 Kgs (144 lbs), each system is extremely versatile and, depending upon the installed software, can be used for a variety of applications.

The Vivid S5 N and Vivid S6 N ultrasound scanner is based on parallel products in the Vivid family (Vivid 3 n, Vivid 7, Vivid i n). Using the same advanced technology, the innovative features and versatility of the system represent the future of ultrasound scanning.

NOTE: Upgrade options may be available with future versions.

NOTE: No upgrade from Vivid S5 N to Vivid S6 N is possible.

1-1-6 Purpose of Operator Manual(s)

The Operator Manual(s) should be fully read and understood before operating the Vivid S5 N or Vivid S6 N system, and also kept near the unit for quick reference.

Section 1-2
Important Conventions

1-2-1 Conventions Used in this Manual

1-2-1-1 Model Designations

This manual covers the Vivid S5 N and Vivid S6 N ultrasound units listed in Table 1-2 "Vivid S5 N and Vivid S6 N Models and Hardware/Software Compatibility" on page 1-3.

1-2-1-2 Icons

Pictures, or icons, are used wherever they will reinforce the printed message. The icons, labels and conventions used on the product and in the service information are described in this chapter.

1-2-1-3 Safety Precaution Messages

Various levels of safety precautions are found on the equipment and throughout this service manual. Different levels of severity are identified by one of the following icons which precede precautionary statements in the text.

DANGER **Indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.**

DANGER **Indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.**

CAUTION **Indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.**

NOTE: Notes are used to provide important information about an item or a procedure. Be sure to read the notes as the information they contain can often save you time or effort.

1-2-1-4 Standard Hazard Icons

Important information will always be preceded by the exclamation point contained within a triangle, as seen throughout this chapter. In addition to text, several different graphical icons (symbols) may be used to make you aware of specific types of hazards that could cause harm.

Table 1-3 Standard Hazard Icons

ELECTRICAL	MECHANICAL	RADIATION

LASER	HEAT	PINCH

Other hazard icons make you aware of specific procedures that should be followed.

Table 1-4 Standard Icons Indicating a Special Procedure Be Used

AVOID STATIC ELECTRICITY	TAG AND LOCK OUT	WEAR EYE PROTECTION

Section 1-3
Safety Considerations

1-3-1 Introduction

The following safety precautions must be observed during all phases of operation, service and repair of this equipment. Failure to comply with these precautions or with specific warnings elsewhere in this manual, violates safety standards of design, manufacture and intended use of the equipment.

1-3-2 Human Safety

Operating personnel must not remove the system covers.
Servicing should be performed by authorized personnel only.
Only personnel who have participated in Vivid S5 N or Vivid S6 N Training are authorized to service the equipment.

1-3-3 Mechanical Safety

DANGER **WHENENVER THE UNIT IS TO BE MOVED ALONG ANY INCLINE, USE EXTREME CAUTION. MAKE SURE THAT THE VIVID S5 N OR VIVID S6 N SCANNER AND ALL PERIPHERALS ARE SECURELY MOUNTED IN PLACE BEFORE ATTEMPTING TO MOVE IT.**

DANGER **ULTRASOUND PROBES ARE HIGHLY SENSITIVE MEDICAL INSTRUMENTS THAT CAN EASILY BE DAMAGED BY IMPROPER HANDLING. USE CARE WHEN HANDLING AND PROTECT FROM DAMAGE WHEN NOT IN USE. DO NOT USE A DAMAGED OR DEFECTIVE PROBE. FAILURE TO FOLLOW THESE PRECAUTIONS CAN RESULT IN SERIOUS INJURY AND EQUIPMENT DAMAGE.**

DANGER **NEVER USE A PROBE THAT HAS BEEN SUBJECTED TO MECHANICAL SHOCK OR IMPACT. EVEN IF THE PROBE APPEARS TO BE UNBROKEN, IT MAY IN FACT BE DAMAGED.**

CAUTION **The Vivid S5 N and Vivid S6 N ultrasound scanner weighs 65kg (144 lbs.) or more, depending on carry-on peripherals when ready for use. Care must be used when moving the unit or replacing its parts. Failure to follow the precautions listed could result in injury, uncontrolled motion and costly damage.**

ALWAYS:

- **Use the handle to move the system**
- **Be sure the pathway is clear**
- **Use slow, careful motions**
- **Do not let the system strike walls or door frames**
- **When moving the system on inclines, make sure that the Vivid S5 N and Vivid S6 N scanner and all peripherals are securely mounted in place before attempting to move the scanner.**
- **The rear handle should only be used for pushing the system. Do NOT use it for pulling the ultrasound scanner (in any direction) as this may cause the system to become unstable in the event of colliding with obstacles.**

1-3-3 Mechanical Safety (cont'd)

WARNING ***Always lock the system in its parked (locked) position after moving. Failure to do so could result in personal injury or equipment damage.***

WARNING ***Equipment damage could result if special care is not taken when transporting the Vivid S5 N and Vivid S6 N system in a vehicle.***

ALWAYS:

- **Eject any media from the media storage devices DVD, MOD (if installed).**
- **Ensure that monitor is in folded and locked position.**
- **Ensure that the Vivid S5 N and Vivid S6 N system is well prepared and packed in its original packaging before transporting. Special care must be taken to correctly position the packing material, using all screws and brackets.**
  For further information, refer to *Chapter 3* - System Setup.
- **Place the probes in their carrying case.**
- **Secure the system in an full down position and lock the wheels (brake).**
- **Ensure that the Vivid S5 N and Vivid S6 N system is firmly secured while inside the vehicle.**
- **Secure the system with straps or as directed otherwise to prevent motion during transport.**
- **Prevent vibration damage by driving cautiously. Avoid unpaved roads, excessive speeds, and erratic stops or starts.**

1-3-4 Electrical Safety

To minimize shock hazard, the equipment must be connected to a well grounded power source. The system is equipped with a three-conductor AC power cable. This must be plugged into an approved electrical outlet with safety grounding.

The power outlet used for this equipment should not be shared with other types of equipment. Both the system power cable and the power connector must meet international electrical standards.

1-3-4-1 Probes

All the probes for the Vivid S5 N and Vivid S6 N ultrasound unit are designed and manufactured to provide trouble-free, reliable service. To ensure this, correct handling of probes is important and the following points should be noted:

- Do not drop a probe or strike it against a hard surface, as this may damage the transducer elements, acoustic lens, or housing.
- Do not use a cracked or damaged probe. In this event, call your field service representative immediately to obtain a replacement.
- Avoid pulling, pinching or kinking the probe cable, since a damaged cable may compromise the electrical safety of the probe.
- To avoid the risk of a probe accidentally falling, do not allow the probe cables to become entangled, or to be caught in the system's wheels.

NOTE: For detailed information on handling endocavity probes, refer to the appropriate supplementary instructions for each probe. In addition, refer to the Vivid S5 N or Vivid S6 N User Manual for detailed probe handling instructions.

1-3-5 Dangerous Procedure Warnings

Warnings, such as the examples below, precede potentially dangerous procedures throughout this manual. Instructions contained in the warnings must be followed.

DANGEROUS VOLTAGES, CAPABLE OF CAUSING DEATH, ARE PRESENT IN THIS EQUIPMENT. USE EXTREME CAUTION WHEN HANDLING, TESTING AND ADJUSTING.

EXPLOSION WARNING

DO NOT OPERATE THE EQUIPMENT IN AN EXPLOSIVE ATMOSPHERE.

OPERATION OF ANY ELECTRICAL EQUIPMENT IN SUCH AN ENVIRONMENT CONSTITUTES A DEFINITE SAFETY HAZARD.

WARNING DO NOT SUBSTITUTE PARTS OR MODIFY EQUIPMENT

BECAUSE OF THE DANGER OF INTRODUCING ADDITIONAL HAZARDS, DO NOT INSTALL SUBSTITUTE PARTS OR PERFORM ANY UNAUTHORIZED MODIFICATION OF THE EQUIPMENT.

Section 1-4
Product Labels and Icons

The Vivid S5 N and Vivid S6 N ultrasound scanner comes equipped with product labels and icons. These labels and icons represent pertinent information regarding the operation of the unit.

1-4-1 Product Rating Plate Locations

The following diagrams show the label and icons found on the Vivid S5 N or Vivid S6 N ultrasound unit. All the labels and icons are described in Table 1-5 "Product Icons" on page 1-12.

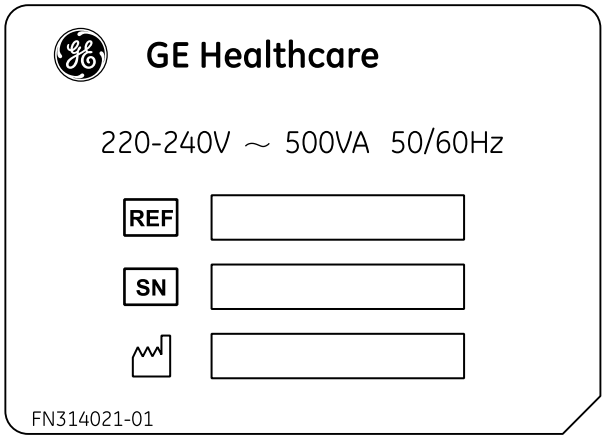


Figure 1-1 Main Label Vivid S5 N and Vivid S6 N (220-240V) International

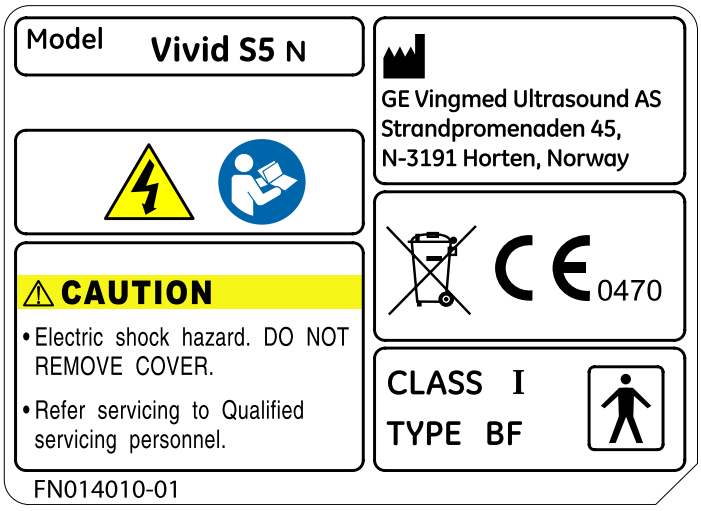


Figure 1-2 Product label - Vivid S5 N

1-4-1 Product Rating Plate Locations (cont'd)

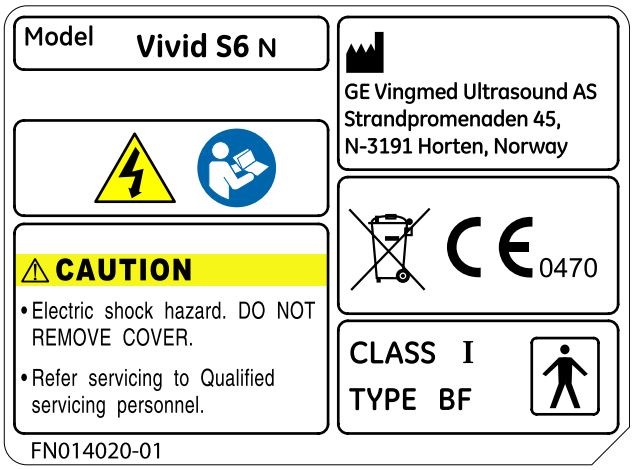


Figure 1-3 Product label - Vivid S6 N

1-4-2 Label Descriptions

The following table shows the labels and symbols that may be found on the Vivid S5 N or Vivid S6 N ultrasound unit, and provides a description of each label's purpose and location.

Table 1-5 Product Icons

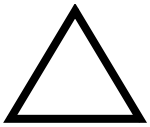
Label Name	Description	Location
Identification and Rating Plate	Manufacturer's name and address. Date of Manufacture. Model and Serial numbers. Electrical ratings (Volts, Amps, phase, and frequency.	On the base of the unit
Type/Class Label	Used to indicate the degree of safety or protection.	Bottom panel of the adapter
	Equipment Type BF (man in the box symbol) IEC 878-02-03 indicates B Type equipment having a floating applied part.	Probe connectors.
	"CAUTION" The equilateral triangle is usually used in combination with other symbols to advise or warn the user.	Various.
	"ATTENTION - Consult accompanying documents" is intended to alert the user to refer to the User Manual or other instructions when complete information cannot be provided on the label.	Various.
	"CAUTION - Dangerous voltage" (the lightning flash with arrowhead in equilateral triangle) is used to indicate electric shock hazards.	Various.
Device Listing/Certification Labels	Laboratory logos or labels that denote conformity with industry safety standards, such as UL or IEC.	On the base of the unit
	CE certification mark.	On the base of the unit
	Equipment Type CF IEC 878-02-05 indicates equipment having a floating applied part that provides a degree of protection suitable for direct cardiac contact.	Above the ECG inlet, ECG connector and surgical probes.

Table 1-5 Product Icons (cont'd)

Label Name	Description	Location
CAUTION - This machine weighs...Special care must be used to avoid..."	This precaution is intended to prevent injury that may be caused by the weight of the machine if one person attempts to move it considerable distances or on an incline.	Used in the Service and User Manual which should be adjacent to equipment at all times for quick reference.
"DANGER - Risk of explosion used in..."	The system is not designed for use with flammable anesthetic gases.	Indicated in the Service Manual.
	"Protective Earth" Indicates the protective earth (grounding) terminal.	Rear of the system.
	"Equipotentiality" Indicates the terminal to be used for connecting equipotential conductors when interconnecting (grounding) with other equipment.	Peripherals
	"ON" indicates the power ON position of the power switch. "Standby" indicates the power stand by position of the power switch. CAUTION This Power Switch DOES NOT ISOLATE Mains Supply.	Adjacent to ON/Standby Switch
	Waste Electrical and Electronic Equipment (WEEE) Disposal This symbol indicates that waste electrical and electronic equipment must not be disposed of as unsorted municipal waste and must be collected separately. Please contact an authorized representative of the manufacturer for information concerning the decommissioning of your equipment.	On the base of the unit. On the rear of the system.

1-4-3 Vivid S6 N Battery Safety

NOTE: The Vivid S6 N ultrasound scanner is supplied with a lithium ion battery in the battery bay, as standard. For the Vivid S5 N, it is supplied as an option.

The lithium ion battery provides power to safely shutdown the system or place it in *Standby* mode, when an AC power source is not available. Lithium ion batteries last longer than conventional batteries and do not require replacement as often. You can expect 4 hours of battery life with a single, fully-charged battery supporting *Standby* mode.

The lithium ion technology used in the system's battery is significantly less hazardous to the environment than the lithium metal technology used in some other batteries (such a watch batteries). Used batteries should not be placed with common household waste products. Contact local authorities for the location of a chemical waste collection program nearest you.

NOTE: Regulations vary for different countries. Dispose of a used battery in accordance with local regulations.

CAUTION USE ONLY BATTERIES APPROVED BY GE HEALTHCARE AS SUITABLE FOR USE WITH THE VIVID S6 N ULTRASOUND SCANNER

WARNING *The Vivid S6 N battery has a safety device.*
DO NOT ATTEMPT TO DIS-ASSEMBLE OR ALTER THE BATTERY!
Always observe the following precautions:

- Charge batteries only when the ambient temperature is between 0^{o} and 65^{o} C (32^{o} and 149^{o} F). and discharge the batteries between -10^{o} and 55^{o} C (14^{o} and 131^{o} F)
- Do not short-circuit the battery by directly connecting the negative terminals with metal objects.
- Do not heat the battery or discard it in a fire.
- Do not expose the battery to temperatures over 60^{o} C (140^{o} F). Keep the battery away from fire and other heat sources.
- Do not charge the battery near a heat source, such as, a fire or heater.
- Do not leave the battery in direct sunlight.
- Do not pierce the battery with a sharp object, hit it, or step on it.
- Do not use a damaged battery.
- Do not apply solder to a battery.
- Do not connect the battery to an electrical power outlet.

WARNING *In the event that the Vivid S5 N or Vivid S6 N ultrasound scanner will not be used for a long period, it is recommended to remove the battery from the system while not in use.*

CAUTION To prevent the battery bursting, igniting, or fumes from the battery causing equipment damage, always observe the following precautions:

- Do not immerse the battery in water or allow it to get wet.
- Do not place the battery into a microwave oven or pressurized container.
- If the battery leaks or emits an odor, remove it from all possible flammable sources.
- If the battery emits an odor or heat, is deformed or discolored, or in a way appears abnormal during use, recharging or storage, ***immediately remove it and stop using it***.
- If you have any questions about the battery, consult your local GE representative.

1-4-3 Vivid S6 N Battery Safety (cont'd)

- Storage of the battery pack:

  Short-term (*less than 1 month*): between 0^{o} C (32^{o} F) and 50^{o} C (122^{o} F).

  Long-term (*more than 3 months*): between 10^{o} C (50^{o} F) and 35^{o} C (95^{o} F)

NOTE: When storing a battery pack for more than 6 months, it is necessary to charge the battery pack at least once every 6 months in order to prevent leakage and deterioration in performance (as a result of self-discharging).

NOTE: When charging the battery for the first time after long-term storage, recover the battery pack to original performance through repeating several cycles of full charging and discharging.

NOTE: When shipped, the Vivid S5 N or Vivid S6 N with the battery it is in a state of being approximately 30% charged. Before use, it is necessary to fully charge and discharge the battery pack up to 3 times, in order to utilize Li-Ion smart packs.

1-4-4 Vivid S5 N and Vivid S6 N External Labels

In addition to the labels described in the previous section, additional labels may be found on the Vivid S5 N or Vivid S6 N ultrasound unit, as described in the following sections:

- *Product Labels* section, see below.
- *GND Label* section, see below.

1-4-4-1 Product Labels

Indicates the ultrasound unit's basic power compliance and regulatory compliance information

The Product label shown below is located on the base assembly.

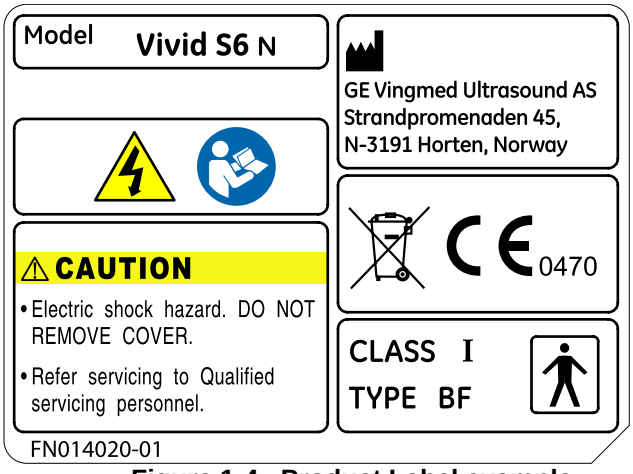


Figure 1-4 Product Label example

1-4-4-2 GND Label

Indicates the protective earth (grounding) terminal. The GND label (shown Figure 1-5 below) is located at the rear of the system.

Figure 1-5 GND Label

Section 1-5
EMC, EMI, and ESD

1-5-1 Electromagnetic Compatibility (EMC)

Electromagnetic compatibility describes a level of performance of a device within its electromagnetic environment. This environment consists of the device itself and its surroundings, including other equipment, power sources and persons with which the device must interface. Inadequate compatibility results when a susceptible device fails to perform as intended due to interference from its environment, or when the device produces unacceptable levels of emission. This interference is often referred to as radio–frequency or electromagnetic interference (RFI/EMI) and can be radiated through space or conducted over interconnecting power or signal cables. In addition to electromagnetic energy, EMC also includes possible effects from electrical fields, magnetic fields, electrostatic discharge and disturbances in the electrical power supply.

1-5-2 CE Compliance

The Vivid S5 N and Vivid S6 N ultrasound scanners conform to all applicable conducted and radiated emission limits and to immunity from electrostatic discharge, radiated and conducted RF fields, magnetic fields and power line transient requirements.

For applicable standards refer to the Safety Chapter in the Vivid S5 N or Vivid S6 N User Manual.

NOTE: For CE Compliance, it is critical that all covers, screws, shielding, gaskets, mesh and clamps are in good condition and installed tightly without skew or stress. Proper installation following all comments noted in this service manual is required in order to achieve full EMC performance.

1-5-3 Electrostatic Discharge (ESD) Prevention

CAUTION: DO NOT TOUCH ANY BOARDS WITH INTEGRATED CIRCUITS PRIOR TO TAKING THE NECESSARY ESD PRECAUTIONS:

1.ALWAYS CONNECT YOURSELF, VIA AN ARM-WRIST STRAP CONNECTED TO THE CAGE ASSEMBLY OR ANY GROUND SCREW WHENEVER YOU OPEN THE SYSTEM FOR MAINTENANCE.

2.FOLLOW GENERAL GUIDELINES FOR HANDLING OF ELECTROSTATIC SENSITIVE EQUIPMENT.

1-5-4 Standards Used

To fulfill the requirements of relevant EC directives and/or European Harmonized/International standards, the following documents/standards have been used:

Table 1-6 Standards Used

Scope	Standard/Directive
Product safety requirements for Electrical Medical devices Class I, Type B with BF and CF applied parts. (ICE catheter and ECG leads)	IEC 60601-1:1988+A1:1991+A2:1995/
	EN 60601-1:1990+A1:1993+A2:1995+A13 :1996
	UL 60601-1 (2003)
	C 22.2 601-1 M90 (R2005)
Product safety requirements for Electrical Medical devices-safety requirements for medical electrical systems	IEC 60601-1-1:2000 EN 60601-1-1:2001
Product safety requirements for Electrical Medical devices-Programmable electrical medical systems	IEC 60601-1-4:1996+A1:1999 EN 60601-1-4:1996+A1:1999
Product safety requirements for Ultrasound system	IEC 60601-2-37:2001+A1:2004+A2:2005 EN 60601-2-37: 2001+A1:2005 +A2:2005
Product EMC requirements Group 1. Class B	IEC 60601-1-2:2001+A1:2004 EN 60601-1-2:200+A1:2006
Biological evaluation of medical devices	ISO 10993-1:2003
Particular requirements for the safety of electrocardiograph monitoring equipment (not for monitoring–only for synchronization with ultrasound)	IEC 60601-2-27:1994 EN 60601-2-27:1994
General requirements for basic safety and essential performance–Usability	IEC 60601-1-6:2004 EN 60601-1-6:2004
Patient privacy	HIPPA

NOTE: For CE Compliance, it is critical that all covers, screws, shielding, gaskets, mesh and clamps are in good condition and installed tightly without skew or stress. Proper installation following all comments noted in this service manual is required in order to achieve full EMC performance.

1-5-5 Lockout/Tagout Requirements (For USA Only)

Follow OSHA Lockout/Tagout requirements to protect service personnel from injuries caused by unexpected energizing or start-up of equipment during service, repair, or maintenance.

Section 1-6
Customer Assistance

1-6-1 Contact Information

If this equipment does not work as indicated in this service manual or in the *Vivid S5 N or Vivid S6 N User Manual*, or if you require additional assistance, please contact the local distributor or appropriate support resource, as listed below.

Prepare the following information before you call:

- System ID and/or serial number.
- Software version.
- Detailed description of any problem encountered.
- Where applicable, save the appropriate log files (by pressing <Alt +D>). It is preferable to save logs directly to the GE ftp site, otherwise onto removable media.

Table 1-7 Phone numbers for Customer Assistance

LOCATION	PHONE NUMBER	
USA GE Healthcare Ultrasound Service Engineering 9900 Innovation Drive Wauwatosa, WI 53226	Service: On-site Service Parts Application Support	1-800-437-1171 1-800-558-2040 1-800-682-5327 or 1-262-524-5698
Canada		1-800-668-0732
Latin America	Service Application Support	1-800-321-7937 1-262-524-5698
Europe (OLC- EMEA) GE Ultraschall Deutschland GmbH Beethovenstraße 239 Postfach 11 05 60, D-42655 Solingen Germany	OLC - EMEA Phone: +49 (0)212 2802 - 652 +33 1 3083 1300 Fax: +49 (0) 212 2802 - 431	
Online Services Ultrasound Asia Australia China India Japan Korea Singapore	 Phone: +(61) 1-800-647-855 +(86) 800-810-8188 +(91) 1-800-11-4567 +(81) 42-648-2924 +(82) 2620 13585 +(95) 6277-3444	

1-6-2 System manufacturer

Table 1-8 System manufacturer

MANUFACTURER	PHONE NUMBER	FAX NUMBER
GE VINGMED ULTRASOUND A/S STRANDPROMENADEN 45 P.O. BOX 141 NO-3191 HORTEN NORWAY	+47 3302 1100	+47 3302 1350

Chapter 2
Site Preparations

Section 2-1
Overview

2-1-1 Purpose of Chapter 2

This chapter provides the information required to plan and prepare for the installation of a Vivid S5 N or Vivid S6 N ultrasound unit. Included are descriptions of the electrical and facility requirements that must be met by the purchaser. A worksheet is provided at the end of this chapter (refer to Figure 2-2 on page 2-10) to help ensure that all the required network information is available, prior to installation.

Table 2-1 Contents in Chapter 2

Section	Description	Page Number
2-1	Overview	2-1
2-2	Console Requirements	2-2
2-3	Facility Needs	2-6

Section 2-2
Console Requirements

2-2-1 Unit Environmental Requirements

Table 2-2 Environmental Requirements

Requirement	Temperature	Relative Humidity (non-condensing)	Air Pressure
Operational	10 — 40°C (50 — 104°F)	30 — 75%	700 — 1060 hPa
Storage	-10 — 60°C (14 — 140°F)	30 — 70%	700 — 1060 hPa
Transport	-10 — 60°C (14 — 140°F))	30 — 70%	700— 1060 hPa

CAUTION **If the system has been in storage or has been transported, please see the acclimation requirements *before* powering ON and/or using the system. 3-2-2 "Installation Warnings" on page 3-2.**

NOTE: After a long period of storage, or after transportation of the system with the monitor in the folded-down position, it is highly recommended to place the monitor in the upright position - and to leave it in this position for a period of longer than 1 hour before use. This will enable it to properly adjust to the environmental conditions.

2-2-2 Cooling Requirements

The cooling requirement for the Vivid S5 N or Vivid S6 N ultrasound unit environment is 3500 BTU/hr. This figure does not include the cooling required for lights, people, or other equipment in the room.

NOTE: Each person in the room places an additional 300 BTU/hr demand on the environmental cooling.

2-2-3 Lighting Requirements

For system installation, updates and repairs, bright lighting is required. However, operator and patient comfort may be optimized if the room lighting is subdued and indirect when a scan is being performed. Therefore, a combination lighting system (dim/bright) is recommended. Keep in mind that monitor lighting can be adjusted automatically on the Vivid S6 N if this option is used.

2-2-4 Time and Manpower Requirements

Site preparation takes time. Begin pre-installation checks as soon as possible to allow sufficient time to make any required changes. If possible, begin these checks as many as six weeks before system delivery.

CAUTION **Only one person is required to unpack the Vivid S5 N or Vivid S6 N ultrasound unit; at least two people must be available to roll the system down the wheeling ramp. Attempts to move the system considerable distances (or on an incline) by one person alone, could result in personal injury, and/or damage to the system.**

2-2-5 Electrical Requirements

NOTE: GE HEALTHCARE requires a dedicated mains power line and Ground for the proper operation of its Ultrasound equipment. This dedicated power line shall originate at the last distribution panel before the system.

Sites with a mains power system with defined Neutral and Live:

The dedicated line shall consist of one phase, a neutral (not shared with any other circuit), and a full size Ground wire from the distribution panel to the Ultrasound outlet.

Sites with a mains power system without a defined Neutral:

The dedicated line shall consist of one phase (two lines), not shared with any other circuit, and a full size Ground wire from the distribution panel to the Ultrasound outlet.

NOTE: Please note that image artifacts can occur, if at any time within the facility, the Ground from the main facility's incoming power source to the Ultrasound unit is only a conduit.

2-2-5-1 Vivid S5 N and Vivid S6 N Power Requirements

Electrical specifications for the Vivid S5 N and Vivid S6 N system are as follows:

Table 2-3 Electrical Requirements

Input Voltage	Tolerances	Op. Current	Frequency
100V AC to 240V AC	±10%	0.5 to 1A	50-60 Hz

2-2-5-2 Inrush Current

Inrush current is not a factor for consideration, due to the inrush current limiting properties of the power supplies.

Table 2-4 Inrush Current

Voltage	Inrush Current	
	Console Only	Console with all Peripherals
100 V	2.3 A	4.5 A
240 V	4.5 A	9 A

2-2-5-3 Site Power Outlets

A dedicated AC power outlet must be within reach of the unit without requiring the use of extension cords. Other outlets adequate for the external peripherals, medical and test equipment required to support this unit must also be present and located within 1 m (3.2 ft) of the unit. Two dedicated outlets for peripherals - located at the rear of the system - should be used for all peripherals attached to the system, unless otherwise indicated. Electrical installation must meet all current local, state, and national electrical codes.

2-2-5-4 Mains Power Plug

The Vivid S5 N and Vivid S6 N portable ultrasound scanner is supplied with a mains power plug, as standard. In the event that the unit arrives without a power plug, or with the wrong plug, contact your GE dealer. When necessary, the installation engineer will supply the appropriate power plug to meet the applicable local regulations.

2-2-5 Electrical Requirements (cont'd)

2-2-5-5 Power Stability Requirements

- **Voltage drop-out**

  Max 10 ms.

- **Power Transients**

  (All applications)

Less than 25% of nominal peak voltage for less than 1 millisecond for any type of transient, including line frequency, synchronous, asynchronous, or aperiodic transients.

2-2-6 EMI Limitations

Ultrasound machines are susceptible to Electromagnetic Interference (EMI) from radio frequencies, magnetic fields, and transients in the air or wiring. They also generate EMI. The Vivid S5 N and Vivid S6 N ultrasound unit complies with limits as stated on the EMC label. However, there is no guarantee that interference will not occur in a particular installation.

NOTE: Possible EMI sources should be identified before the unit is installed, and should not be on the same line as the ultrasound system. A dedicated line should be used for the ultrasound system.

Electrical and electronic equipment may produce EMI unintentionally as the result of a defect. Sources of EMI include the following:

- Medical lasers.
- Scanners.
- Cauterizing guns.
- Computers.
- Monitors.
- Fans.
- Gel warmers.
- Microwave ovens.
- Portable phones.
- Broadcast stations and mobile broadcasting machines.

2-2-6 EMI Limitations (cont'd)

The following table lists recommendations for preventing EMI:

Table 2-5 EMI Prevention/ Abatement

EMI Rule	Details
Ground the unit.	Poor grounding is the most likely reason an ultrasound unit will have noisy images. Check the grounding of the power cord and power outlet.
Be aware of RF sources.	Keep the unit at least 5m (16.4 ft) away from other EMI sources. Special shielding may be required to eliminate interference problems caused by high frequency, high powered radio or video broadcast signals.
Replace and/or reassemble all screws, RF gaskets, covers and cores.	After you finish repairing or updating the system, replace all covers and tighten all screws. Any cable with an external connection requires a magnet wrap at each end. Install the shield over the front of the card cage. Loose or missing covers or RF gaskets allow radio frequencies to interfere with the ultrasound signals.
Replace broken RF gaskets.	If more than 20% or a pair of the fingers on an RF gasket are broken, replace the gasket. Do not turn ON the unit until any loose metallic part is removed and replaced, if required.
Do not place labels where RF gaskets touch metal.	Never place a label where RF gaskets meet the unit. Otherwise, the gap created will permit RF leakage. In case a label has been found in such a location, move the label to a different, appropriate location.
Use GE-specified harnesses and peripherals.	The interconnect cables are grounded and require ferrite beads and other shielding. Cable length, material, and routing are all important; do not make any changes that do not meet all specifications.
Take care with cellular phones.	Cellular phones may transmit a 5 V/m signal that causes image artifacts.
Properly address peripheral cables.	Do not allow cables to lie across the top of the system. Loop any peripheral cable excess length into one bundle.

2-2-7 Probe Environmental Requirements

Table 2-6 Probe Operation and Storage Temperatures

	Electronics
Operation	10 — 40^{o}C (50 — 104^{o}F)
Storage	-20 — 50^{o}C (-4 — 122^{o}F)

*NOTE: System and electronic probes are designed for storage temperatures of -20^{o} to +50^{o} C. When exposed to large temperature variations, the probes should be kept at room temperature for a minimum of **10 hours** before use.*

Section 2-3
Facility Needs

2-3-1 Purchaser Responsibilities

The work and materials required to prepare the site are the responsibility of the purchaser. To avoid delay, complete all pre-installation work before delivery. Use the Pre-installation Check List (provided in Table 2-7 "Vivid S5 N and Vivid S6 N Pre-Installation Check List" on page 2-12) to verify that all the required steps have been completed.

Purchaser responsibilities include:

- Procuring the required materials.
- Completing the preparations prior to delivery of the ultrasound system.
- Paying the costs of any alterations and modifications not specifically provided for in the sales contract.

NOTE: All relevant preliminary electrical installations at the prepared site must be performed by licensed electrical contractors. Other connections between electrical equipment, and calibration and testing, must also be performed by qualified personnel. The products involved (and the accompanying electrical installations) are highly sophisticated and special engineering competence is required. All electrical work on these products must comply with the requirements of applicable electrical codes. The purchaser of GE equipment must utilize only qualified personnel to perform electrical servicing of the equipment.

To avoid delays during installation, the individual or team who will perform the installation should be notified at the earliest possible date (preferably prior to installation), of the existence of any of the following variances:

- Use of any non-listed product(s).
- Use of any customer provided product(s).
- Placement of an approved product further from the system than the interface kit allows.

The prepared site must be clean prior to delivery of the system. Carpeting is not recommended because it collects dust and creates static. Potential sources of EMI should also be investigated before delivery. Dirt, static, and EMI can negatively impact system reliability.

2-3-2 Mandatory Site Requirements

The following are mandatory site requirements. Additional (optional) recommendations, as well as a recommended ultrasound room layout, are provided in section *2-3-3 - Site Recommendations* (see below).

- A dedicated single branch power outlet of adequate amperage (see Table 2-3 "Electrical Requirements" on page 2-3) that meets all local and national codes and is located less than 2.5 m (8.2 ft) from the unit's proposed location. 2-2-5 "Electrical Requirements" on page 2-3
- A door opening of at least 0.54 m (1.77 ft) in width.
- The proposed location for the unit is at least 0.2 m (0.67 ft) from the walls, to enable cooling.
- Power outlet and place for any external peripheral are within 2 m (6.5 ft.) of each other with peripheral within 1 m of the unit to connect cables.
- Power outlets for other medical equipment and gel warmer.
- Power outlets for test equipment within 1 m (3.3 ft) of the ultrasound unit.
- Clean and protected space for storage of probes (either in their case or on a rack).
- Material to safely clean probes (performed using a plastic container, never metal).
- In the case of a network option:
  - An active network outlet in the vicinity of the ultrasound unit.
  - A network cable of appropriate length (regular Pin-to-Pin network cable).
  - An IT administrator who will assist in configuring the unit to work with your local network. A fixed IP address may be required when using DICOM. Refer to the form provided in Figure 2-2 "Connectivity Installation Worksheet" on page 2-10 for network details that are required.

NOTE: All relevant preliminary network outlets installations at the prepared site must be performed by authorized contractors. The purchaser of GE equipment must utilize only qualified personnel to perform servicing of the equipment.

2-3-3 Site Recommendations

The following are (optional) site recommendations. Mandatory site requirements are provided in the *Mandatory Site Requirements* section, above.

- Door opening of 92 cm (3 ft) in width.
- Accessible circuit breaker for a dedicated power outlet.
- Sink with hot and cold running water.
- Receptacle for bio–hazardous waste, for example, used probe sheaths.
- Emergency oxygen supply.
- Storage area for linens and equipment.
- Nearby waiting room, lavatory, and dressing room.
- Dual level lighting (bright and dim).
- Lockable cabinet for software and manuals.

2-3-3-1 Recommended Ultrasound Room Layout

Figure 2-1 below shows a floor plan illustrating the recommended layout of the Ultrasound Room and depicting the minimal room layout requirements.

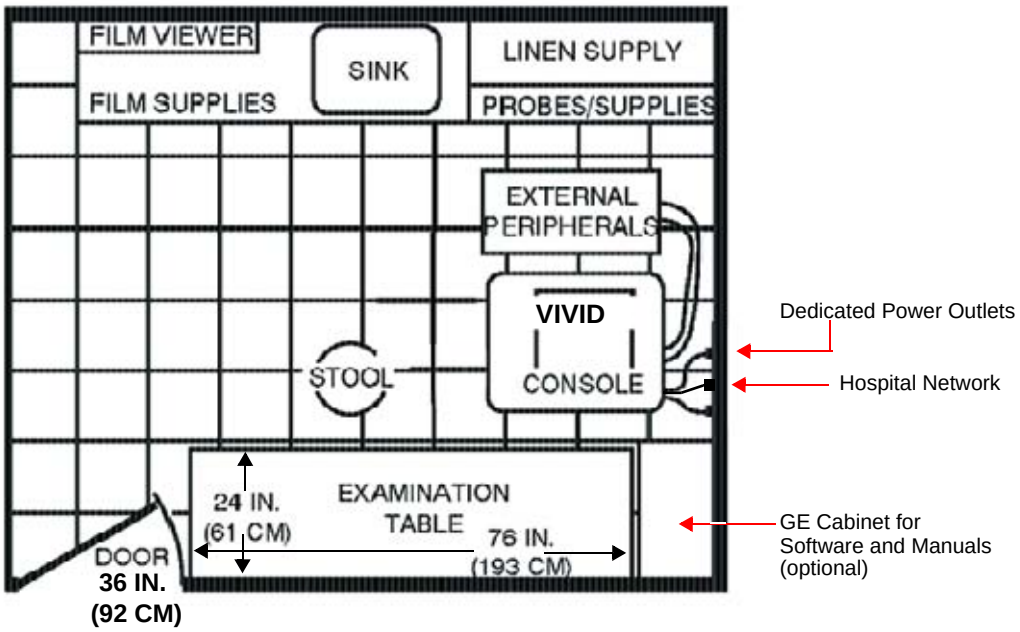


Figure 2-1 Recommended Floor Plan 4.3m x 5.2m (14 ft x 17 ft)

2-3-4 Networking Pre-Installation Requirements

2-3-4-1 Stand-alone Unit (without Network Connection)

None.

2-3-4-2 Unit Connected to Hospital's Network

Supported networks:

- Wireless LAN

2-3-4-3 Purpose of the DICOM Network Function

DICOM services provide the operator with clinically useful features for moving images and patient information over a hospital network. Examples of DICOM services include the transfer of images to workstations for viewing or transferring images to remote printers. As an added benefit, transferring images in this manner frees up the on-board monitor and peripherals, enabling viewing to be done while scanning continues. With DICOM, images can be archived, stored, and retrieved faster, easier, and at a lower cost.

2-3-4-4 DICOM Option Pre-Installation Requirements

To configure the Vivid S5 N or Vivid S6 N ultrasound unit to work with other network connections, the network administrator must provide the required information, which should include the following:

- **Details**: DICOM network details for the Vivid S5 N or Vivid S6 N unit, including the host name, local port, IP address, AE title and net mask.
- **Routing Information**: IP addresses for the default gateway and other routers in use at the site.
- **DICOM Application Information**: Details of the DICOM devices in use at the site, including the DICOM host name, AE title and IP addresses.

Section 2-4
Connectivity Installation Worksheet

Site System Information

Site:

Dept:

Floor:

Room:

Comments:

Vivid S5 N or
Vivid S6 N SN:

Type:

REV:

CONTACT INFORMATION

Name	Title	Phone	E-Mail Address

TCP/IP Settings

Scanner IP Settings

Name - AE Title:

IP Address:

Subnet Mask:

Default Gateway:

Remote Archive Setup
(Echo Server/GEMNet Server/EchoPac PC)

Name - AE Title:

IP Address:

Subnet Mask:

Default Gateway:

Server Name:

Remote DB User Name:

Services (Destination Devices)

	Device Type	Manufacturer	Name	IP Address	Port	AE Title
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						

Figure 2-2 Connectivity Installation Worksheet

Section 2-4 Connectivity Installation Worksheet (cont'd)

Vivid S5 N or Vivid S6 N

Host Name _____ **Local Port** _____ **IP Address** ___ . ___ . ___ . ___

AE Title _____ **Net Mask** ___ . ___ . ___ . ___

ROUTING INFORMATION

	Destination IP Addresses	GATEWAY IP Addresses
Default		___ . ___ . ___ . ___
ROUTER1	___ . ___ . ___ . ___	___ . ___ . ___ . ___
ROUTER2	___ . ___ . ___ . ___	___ . ___ . ___ . ___
ROUTER3	___ . ___ . ___ . ___	___ . ___ . ___ . ___

DICOM APPLICATION INFORMATION

	NAME	MAKE/REVISION	AE TITLE	IP ADDRESSES	PORT
Store 1				___ . ___ . ___ . ___	
Store 2				___ . ___ . ___ . ___	
Store 3				___ . ___ . ___ . ___	
Store 4				___ . ___ . ___ . ___	
Store 5				___ . ___ . ___ . ___	
Store 6				___ . ___ . ___ . ___	
Work list				___ . ___ . ___ . ___	
Storage Commit				___ . ___ . ___ . ___	
MPPS				___ . ___ . ___ . ___	

Figure 2-3 Worksheet for DICOM Network Information

Section 2-4 Connectivity Installation Worksheet (cont'd)

Table 2-7 Vivid S5 N and Vivid S6 N Pre-Installation Check List

Action	Yes	No
Schedule at least 3 hours for installation of the system.		
Notify installation team of the existence of any variances from the basic installation.		
Make sure system and probes have been subject to acclimation period.		
Environmental cooling is sufficient.		
Lighting is adjustable to adapt to varying operational conditions of the scanner.		
Electrical facilities meet system requirements.		
EMI precautions have been taken and all possible sources of interference have been removed.		
Mandatory site requirements have been met.		
If a network is used, IP address has been set for the system and a dedicated network outlet is available.		

Chapter 3
System Setup

Section 3-1
Overview

3-1-1 Purpose of Chapter 3

This chapter provides instructions for installing the Vivid S5 N and Vivid S6 N ultrasound unit. Before beginning the installation process, an appropriate site must be prepared, as described in *Chapter 2 - Site Preparations*. Once the site has been prepared, installation can proceed as described in this chapter.

Included in this chapter are guidelines for transporting the unit to a new site, as well as procedures that describe how to receive and unpack the equipment, and (if necessary) how to file a damage or loss claim. Instructions for checking and testing the unit, probes, and external peripherals for electrical safety are also provided.

NOTE: Depending on the customer's specific requirements, the Vivid S5 N or Vivid S6 N portable ultrasound scanner will have been supplied. Where applicable, the installation procedures for each scenario are clearly identified in this chapter.

Table 3-1 Contents in Chapter 3

Section	Description	Page Number
3-1	Overview	3-1
3-2	Installation Reminders	3-2
3-3	Receiving and Unpacking the Equipment	3-4
3-4	Preparing for Installation	3-14
3-5	Completing the Hardware Installation	3-23
3-6	Configuration	3-61
3-7	Connectivity Setup	3-78
3-8	Storing and Transporting the Unit	3-167
3-9	Completing the Installation Paperwork	3-168

Section 3-2
Installation Reminders

3-2-1 Average Installation Time

The Vivid S5 N or Vivid S6 N installation and functional checkout will take approximately one hour; Vivid S5 N or Vivid S6 N consoles with optional equipment may take slightly longer.

Once the site has been prepared, the average installation time required is shown in Table 3-2 below.

Table 3-2 Average Installation Time

Description	Average Installation Time	Comments
Unpacking the scanner	30 minutes	
Installing the scanner	30 minutes	Time may vary, according to the required configuration
DICOM Option (connectivity)	30 minutes	Time may vary, according to the required configuration

3-2-2 Installation Warnings

1.) The Vivid S5 N or Vivid S6 N ultrasound scanner weighs 65 Kgs (143 lbs), without add-ons/peripherals.
Two persons are always required to unpack the system.

2.) There are no operator-serviceable components. To prevent shock, do not remove any covers or panels. If problems or malfunctions occur, unplug the power cord. Only qualified service personnel should carry out servicing and troubleshooting.

NOTE: For information on shipping carton labels, refer to Figure 3-1 "Drop and Tilt Indicators" on page 3-5 and Figure 3-4 "Additional Labels on Shipping Carton" on page 3-7.

3-2-2-1 System Acclimation Time

Following transport, the Vivid S5 N or Vivid S6 N system may be very cold, or hot. Allow time for the system to acclimate before being switched ON. Acclimation requires 1 hour for each 2.5^{o}C increment, when the temperature of the system is below 10^{o}C or above 35^{o}C

.

CAUTION Turning the system ON after arrival at the site - without allowing time for acclimation - may cause system damage!

Table 3-3 Vivid S5 N and Vivid S6 N System Acclimation Time

°C	60	55	50	45	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40
°F	140	131	122	113	104	96	86	77	68	59	50	41	32	23	14	5	-4	-13	-22	-31	-40
Hrs	8	6	4	2	0	0	0	0	0	0	0	2	4	6	8	10	12	14	16	18	20

NOTE: After a long period of storage, or after transportation of the system with the monitor in the folded-down position, it is highly recommended to place the monitor in the upright position - and to leave it in this position for a period of longer than 1 hour before use. This will enable it to properly adjust to the environmental conditions.

3-2-3 Safety Reminders

DANGER **WHEN USING ANY TEST INSTRUMENT THAT IS CAPABLE OF OPENING THE AC GROUND LINE (I.E., METER'S GROUND SWITCH IS OPEN), DO NOT TOUCH THE UNIT!**

WARNING **Two people are required to unpack the system as it is heavy. Two people are always required whenever a part weighing 19kg (35 lb.) or more must be lifted**

CAUTION **If the unit is very cold or hot, do NOT turn ON power to the unit until it has had sufficient time to acclimate to its operating environment.**

CAUTION **To prevent electrical shock, connect the unit to a properly grounded power outlet. Do NOT use a three-prong to two-prong adapter, as this defeats safety grounding.**

CAUTION **Do NOT wear the ESD wrist strap when you work on live circuits where more than 30 V peak is present.**

CAUTION **Do NOT operate the unit unless all board covers and frame panels are securely in place, to ensure optimal system performance and cooling. (When covers are removed, EMI may be present).**

WARNING **ACOUSTIC OUTPUT HAZARD**
Although the ultrasound energy transmitted from the Vivid S5 N or Vivid S6 N portable ultrasound scanner is within AIUM/NEMA standards and FDA limitations, avoid unnecessary exposure. Ultrasound energy can produce heat and mechanical damage.

NOTE: The Vivid S5 N or Vivid S6 N User Manual should be fully read and understood before operating the unit. Keep the manual near the unit for reference.

Section 3-3
Receiving and Unpacking the Equipment

CAUTION **Please read this section fully before unpacking the Vivid S5 N or Vivid S6 N ultrasound unit.**

The Vivid S5 N or Vivid S6 N ultrasound unit, together with the peripherals, probes, cables, and accessories, are shipped from the factory in a single cardboard shipping carton mounted on a raised wooden base - see Figure 3-2 "Shipping Carton - Vivid S5 N and Vivid S6 N with Peripherals" on page 3-6.

Where the specific customer requirements are for a Vivid S5 N or Vivid S6 N ultrasound unit with peripherals, this is shipped in a smaller-sized cardboard shipping carton mounted on a raised wooden base, or placed on top of the main cardboard carton that contains the scanner- see Figure 3-3 "Shipping Carton - Vivid S5 N and Vivid S6 N Only" on page 3-7.

Unpacking instructions for each type of shipping carton are provided separately in the following sections:

- 3-3-1-1 "Unpacking the Vivid S5 N or Vivid S6 N with Peripherals" on page 3-8
- 3-3-1-2 "Unpacking the Vivid S5 N or Vivid S6 N" on page 3-9

NOTE: *For details of weights and dimensions of all three shipping cartons, refer to Table 3-4 on page 7.*

Each cardboard shipping carton is sealed with plastic tape and secured on the outside with plastic straps. The interior of the carton is fully lined with re-sealable water-proof wrapping to protect the contents from external moisture; silica gel bags are also placed among the contents to absorb any condensation or moisture within the carton.

Before unpacking the unit

- Inspect the carton for visible damage.
- Inspect the *Drop and Tilt* indicators (on the Shock-watch and Tilt-watch labels, respectively) for evidence of accidental shock or tilting during transit (damage incident) - refer to Figure 3-1 "Drop and Tilt Indicators" on page 3-5.

NOTICE After unpacking the unit:
It is recommended to keep and store the shipping carton and all other packing materials (including the support foams, anti-static plastic cover, etc.), in case the unit has to be moved to a different location in the future.

For warranty purposes, storage of the above is required for one year from date of purchase.

Section 3-3 Receiving and Unpacking the Equipment (cont'd)

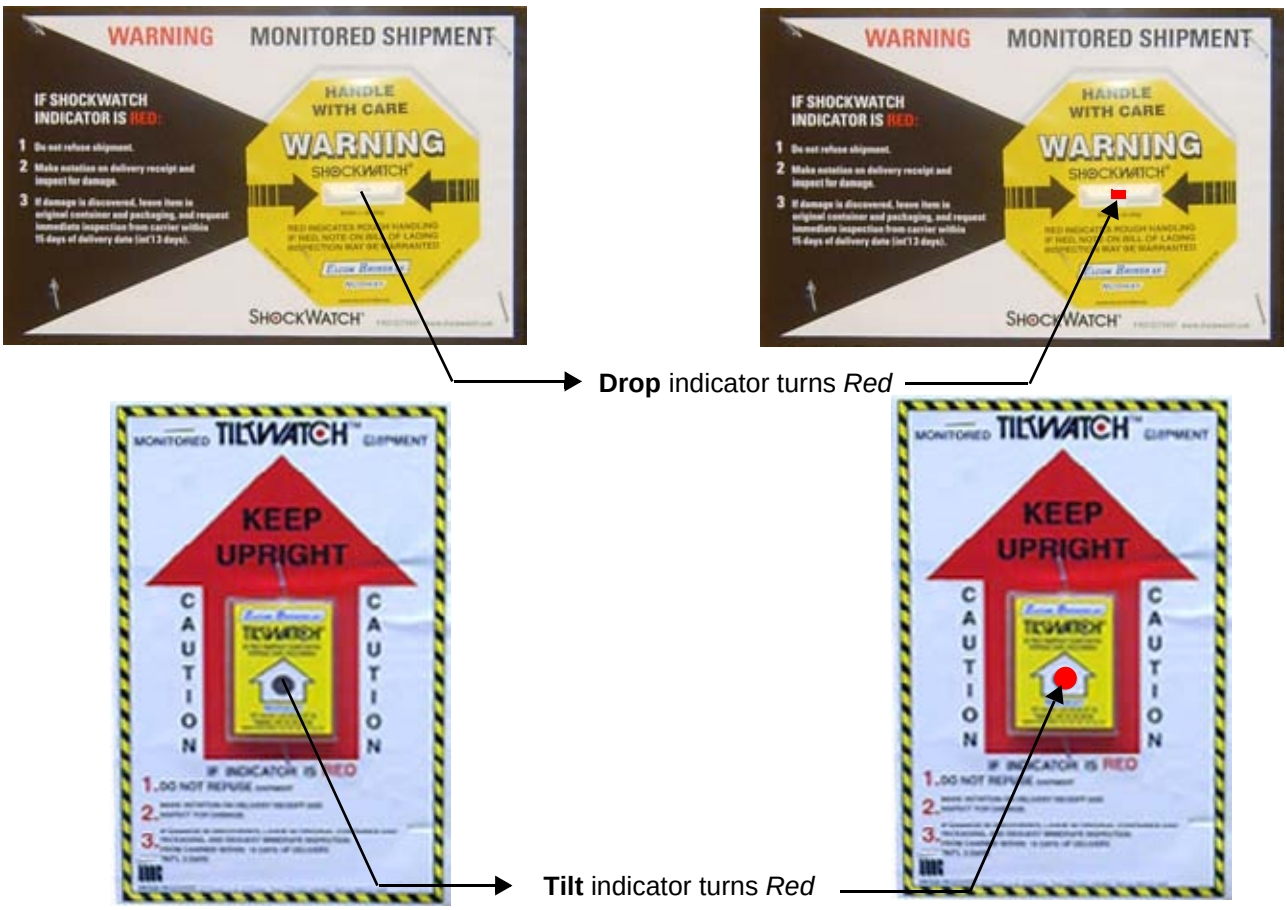
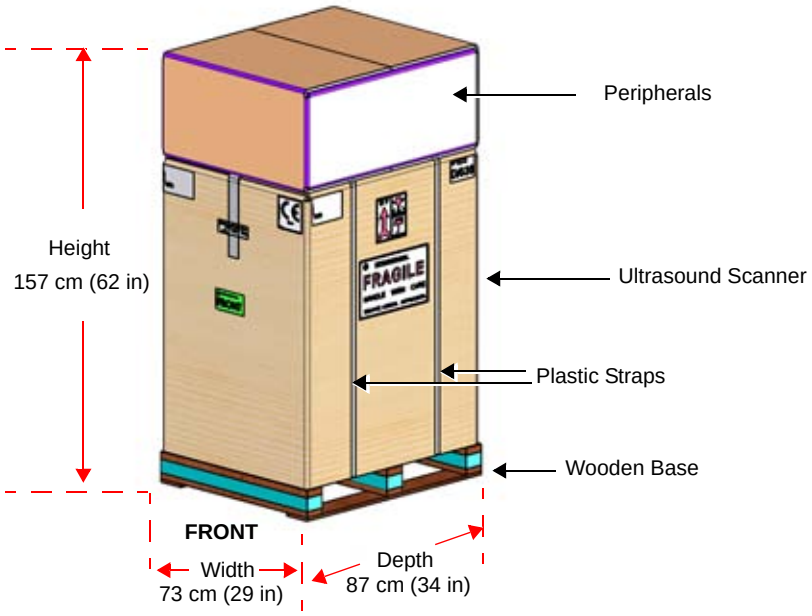


Figure 3-1 Drop and Tilt Indicators

If the carton is damaged, or if either the Drop (Shock) or Tilt indicators have turned red (indicating damage incident*), please inform the* GE HEALTHCARE *sales representative immediately. In addition, mark on the shipping consignment note or packing slip/post-delivery checklist (in the "Package" column) that the Tilt and/or Drop indicators show* damage incident.

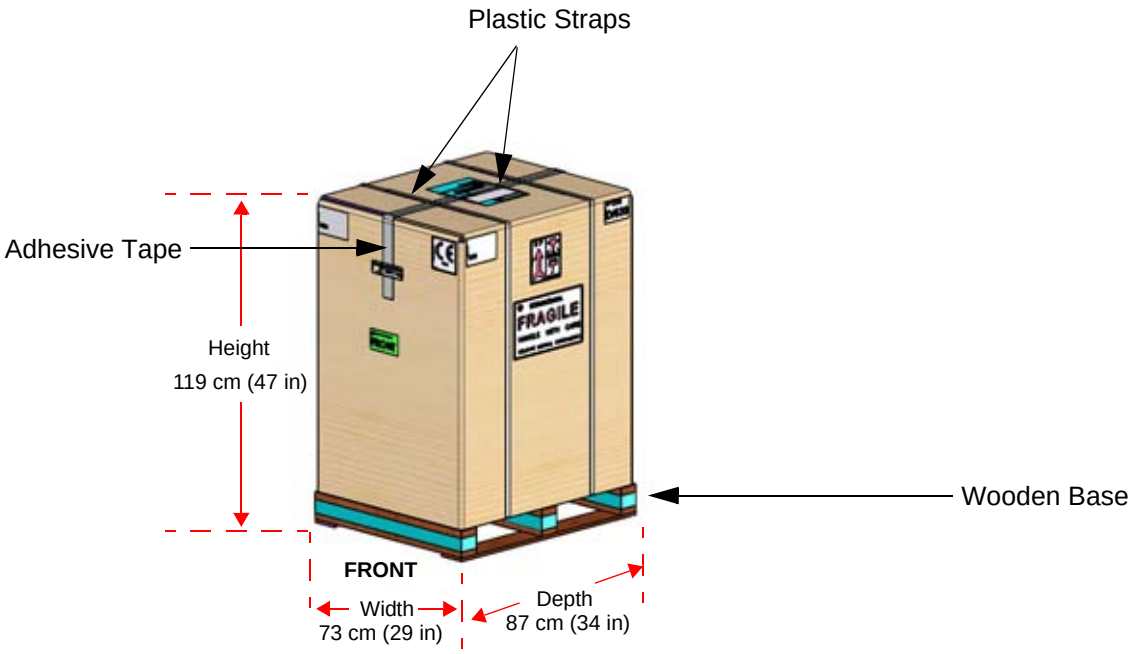
Section 3-3 Receiving and Unpacking the Equipment (cont'd)



Note: Weight = 105 Kgs (231 lbs)

Figure 3-2 Shipping Carton - Vivid S5 N and Vivid S6 N with Peripherals

Section 3-3 Receiving and Unpacking the Equipment (cont'd)



Note: Weight = 95 Kgs (209 lbs)

Figure 3-3 Shipping Carton - Vivid S5 N and Vivid S6 N Only

Table 3-4 Shipping Cartons - Dimensions and Weights

Description	Height	Width	Depth	Weight[a]
Vivid S5 N or Vivid S6 N scanner with peripherals and accessories	157 cm 62 ins	73 cm 29 ins	87 cm 34 ins	105 kgs 231 lbs
Vivid S5 N or Vivid S6 N scanner only	119 cm 47 ins	73 cm 29 ins	87cm 34 ins	95 kgs 209 lbs

a. Weight is approximate and will vary depending upon the supplied peripherals

Figure 3-4 Additional Labels on Shipping Carton

3-3-1 Unpacking the Cardboard Shipping Carton

As previously described, the Vivid S5 N or Vivid S6 N ultrasound unit is packed in a single cardboard shipping carton comprising a durable outer cardboard carton cover and a wooden platform base; these are firmly joined together with plastic straps. After completing a visual inspection of the shipping carton and *Drop/Tilt* indicators, proceed to the unpacking instructions below, as appropriate

3-3-1-1 Unpacking the Vivid S5 N or Vivid S6 N with Peripherals

1.) Cut the plastic straps securing the shipping carton to the wooden base - see Figure 3-2 "Shipping Carton - Vivid S5 N and Vivid S6 N with Peripherals" on page 3-6.

CAUTION When using sharp tools to open packing materials, take care to avoid cutting or damaging any of the contents.

2.) Remove the options peripherals box (smaller-sized cardboard shipping carton) from the top of the main cardboard shipping carton that contains the scanner.

3.) Carefully cut the adhesive tape used to close the shipping carton lids, and open the cartons from the top.

4.) Undo the re-sealable water-proof carton liners.

5.) Remove the packing slip (shipping consignment note) detailing the contents of the shipping carton and keep close to hand ready to mark the check list - refer to 3-4-2 "Verifying the Shipping Carton Contents" on page 3-14.

6.) Continue with unpacking the main cardboard shipping carton that contains the scanner, as indicated in 3-3-1-2 "Unpacking the Vivid S5 N or Vivid S6 N" on page 3-9.

3-3-1 Unpacking the Cardboard Shipping Carton (cont'd)

3-3-1-2 Unpacking the Vivid S5 N or Vivid S6 N

1.) Cut the two plastic straps securing the shipping carton to the wooden base - see Figure 3-3 "Shipping Carton - Vivid S5 N and Vivid S6 N Only" on page 3-7.

CAUTION **When using sharp tools to open packing materials, take care to avoid cutting or damaging any of the contents.**

2.) Carefully cut the adhesive tape used to close the shipping carton upper lid and open the four folded flaps - see Figure 3-5 "Opening the Shipping Carton" on page 3-9.

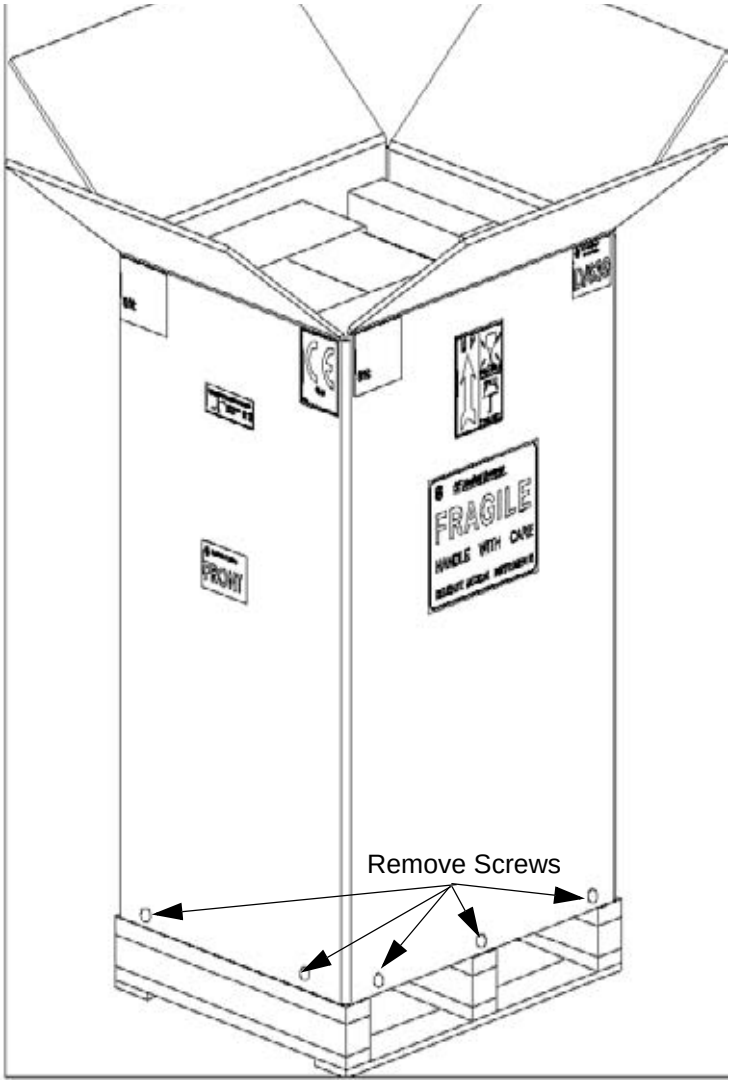


Figure 3-5 Opening the Shipping Carton

3.) From each side, remove the screws securing the outer cardboard to the wooden base.

4.) Remove the outer cardboard walls pulling them gently *upwards* and away from the system (Figure 3-6 "Wheeling Ramp in Upright Position" on page 3-10).

3-3-1 Unpacking the Cardboard Shipping Carton (cont'd)

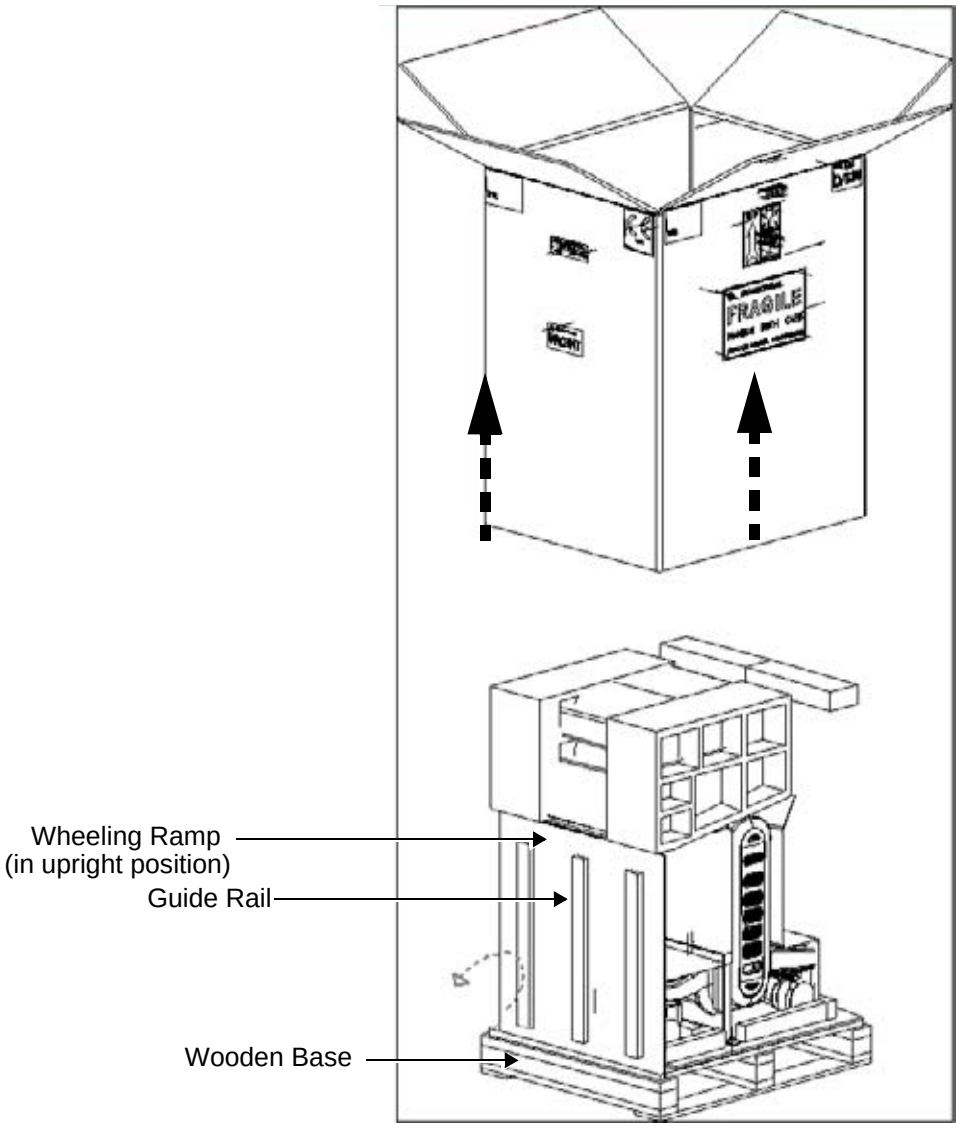


Figure 3-6 Wheeling Ramp in Upright Position

NOTE: The front side of the carton is re-inforced with wooden guide rails and, when dropped down in the open position, these form a strong ramp used for wheeling the system out of the shipping carton.

5.) Remove the packing slip (shipping consignment note) detailing the contents of the shipping carton and keep close to hand ready to mark the check list - refer to 3-4-2 "Verifying the Shipping Carton Contents" on page 3-14.

3-3-1 Unpacking the Cardboard Shipping Carton (cont'd)

6.) Lower the wheeling ramp into the unloading position, as shown in Figure 3-7 below.

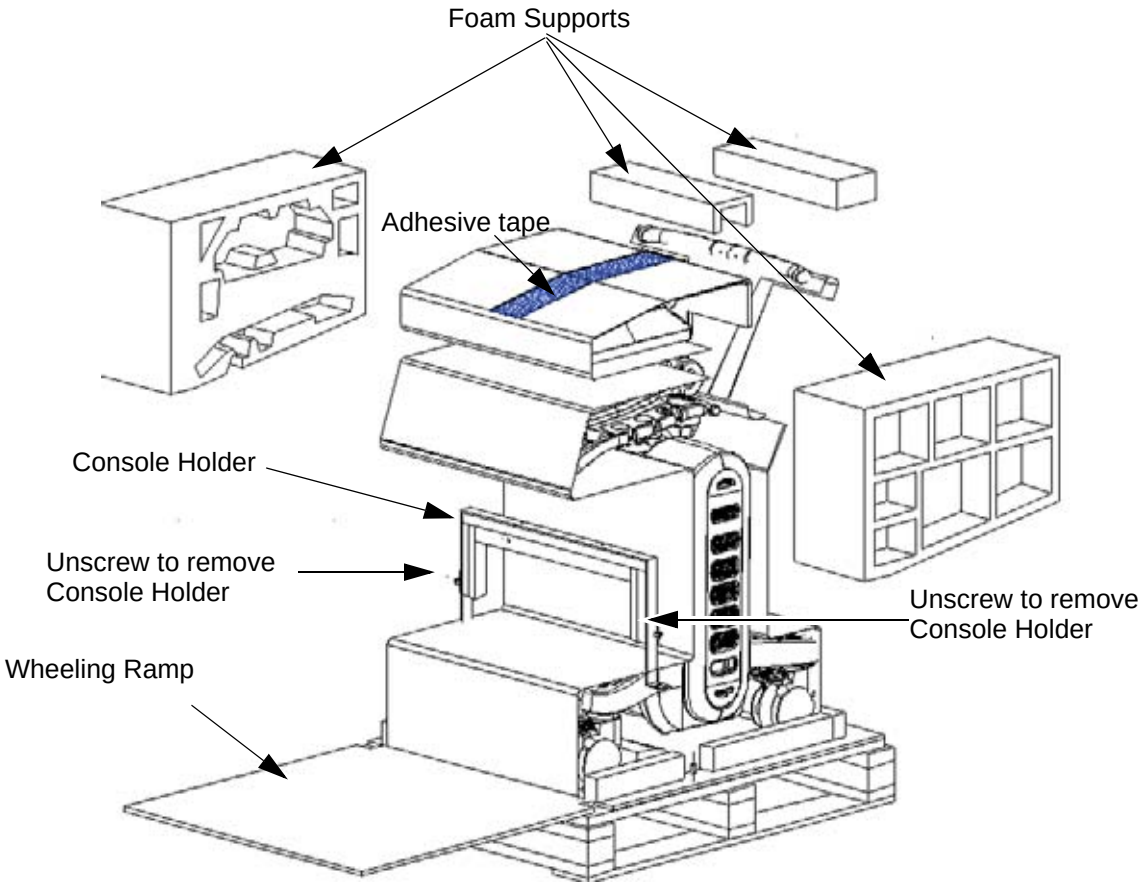


Figure 3-7 Wheeling Ramp in Unloading Position for Scanner Removal

7.) Carefully remove the foam supports - see Figure 3-8 below.

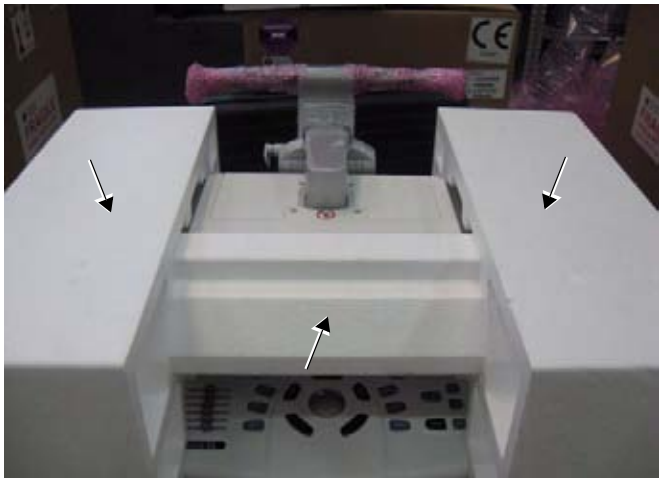


Figure 3-8 Foam Supports Protecting the LCD Screen

3-3-1 Unpacking the Cardboard Shipping Carton (cont'd)

8.) Remove the two screws that secure the console holder, then remove the holder, refer Figure 3-7 "Wheeling Ramp in Unloading Position for Scanner Removal" on page 3-11.

9.) Carefully remove the adhesive tape from the top of the system and spread the anti-static nylon on the floor.

10.) Remove any additional packing material from in front of and surrounding the system.

11.) Remove the two silica gel bags (Figure 3-9 below)

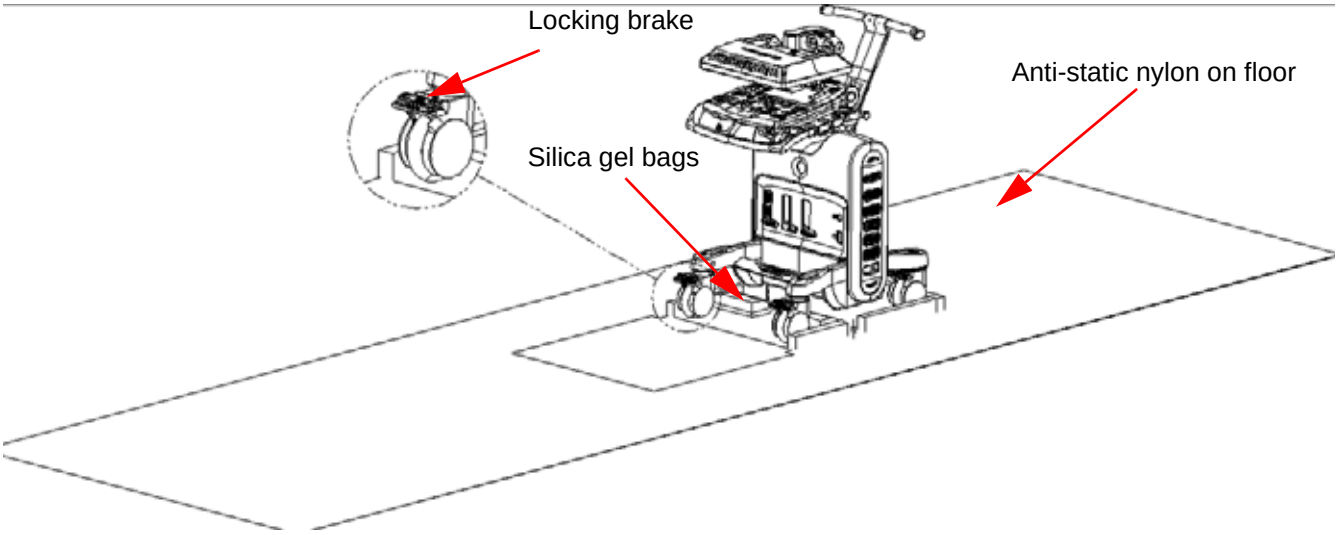


Figure 3-9 Locking Wheel Brake

12.) Press down on the locking brake to unlock the wheel. Repeat for the three other wheels.

13.) Using two people, carefully roll the scanner *forwards* down the unloading ramp to remove it completely from the shipping carton.

CAUTION

Two people are required when moving the Vivid S5 N or Vivid S6 N scanner.

This precaution is intended to prevent injury that may be caused by the weight of the system if one person attempts to move the scanner considerable distances or on an incline.

14.) Make sure the system is standing firmly on the floor before applying the locking brake.

15.) Remove the foam sections from the top of the system and from between the main shelf and probe shelf.

16.) Using the up/down handle, raise the main shelf up to appropriate height.

17.) Pull the monitor locking pin towards you and lift the monitor into the upright position.

18.) Before commencing the installation procedure, follow the instructions for 3-3-2 "Verifying the Shipping Carton Contents" on page 3-13.

3-3-2 Verifying the Shipping Carton Contents

After unpacking, it is important to verify that all items ordered by the customer have been received (refer to “Verifying the Shipping Carton Contents” on page 14). Compare all items listed on the packing slip (shipping consignment note) with those received and report any items that are missing, back-ordered, or damaged, to your GE HEALTHCARE sales representative. The contact address is shown in 1-6-1 "Contact Information" on page 1-19.

NOTICE It is recommended to keep and store the shipping carton and all other packing materials (including the support foams, anti-static plastic cover, etc.), in case the unit has to be moved to a different location in the future.

For warranty purposes, storage of the above is required for one year from date of purchase.

3-3-3 Physical Inspection

3-3-3-1 System Voltage Settings

Verify that the Vivid S5 N or Vivid S6 N ultrasound AC is set to the correct voltage.

The Voltage settings are:

- 220-240V AC - Europe, all Asia excluding Japan and Taiwan.
- 100-120V AC - Americas, Japan and Taiwan.

WARNING ***Setting the* Vivid S5 N or Vivid S6 N ultrasound components *to the wrong voltage setting will most likely destroy the equipment.***

3-3-4 EMI Protection

The Vivid S5 N or Vivid S6 N Ultrasound Unit has been designed to minimize the effects of Electro Magnetic Interference (EMI). Many of the covers, shields, and screws are provided primarily to protect the system from image artifacts caused by this interference. For this reason, it is imperative that all covers and hardware are installed and secured before the unit is put into operation.

Section 3-4
Preparing for Installation

3-4-1 Confirming Customer Order

When preparing for installation of a Vivid S5 N or Vivid S6 N system, it is important to verify that all items ordered by the customer have been received. Compare all items listed on the packing slip (shipping consignment note) with those received and report any items that are missing, back-ordered, or damaged, to your GE HEALTHCARE sales representative.

3-4-2 Verifying the Shipping Carton Contents

In addition to the Vivid S5N or Vivid S6N portable ultrasound Scanner there is a shipping Carton. The shipping carton includes external accessories, probes, software CD's, user manual and optional peripherals (as ordered). Ensure that all relevant components are presents before completing the installation.

3-4-2-1 Optional Peripherals

The shipping carton will only contain any of the optional peripherals if they have been ordered with the Vivid S5 N or Vivid S6 N system. Table 3-5 "Optional Peripherals" on page 3-14 lists all possibilities.

Table 3-5 Optional Peripherals

Part Description	Part No
HP Network Printer	H45541MJ
Digital B&W Video Printer (for Vivid S6N)	H45551YW
Digital B&W Video Printer (for Vivid S5N)	H45551YX
Digital Color Video Printer	H45531XB
B&W Paper (for H45551YW)	EN0473
Color Paper (for H45531XB)	E70151SA
USB Flash Card (1.0GB)	H45551XT
MOD	H45551XW
MO Media	H45001JK
Ext ECG Cable	H45551WD
Foot Switch	H45551WE
Rear Tray	H45551WF

3-4-3 Component Inspection

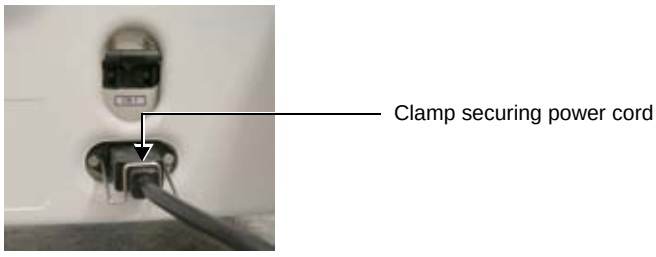
After verifying that all the required parts are included in the shipping crate, inspect the system components using the checklist supplied below. In addition, ensure that all the labels described in *Chapter 1 -* are present, accurate and in good condition, and enter the serial number printed on the main label into the system installation details card, as described in 3-9-1 "System Installation Details" on page 3-168.

3-4-3-1 Damage Inspection Checklist

Visually inspect the contents of the shipping carton for damage. If any parts are damaged or missing, contact an authorized GE Service Representative.

A *Damage Inspection Checklist* for the Vivid S5 N or Vivid S6 N portable ultrasound scanner is provided in Table 3-6 "Damage Inspection Checklist - Vivid S5 N and Vivid S6 N Systems" on page 3-16.

Table 3-6 Damage Inspection Checklist - Vivid S5 N and Vivid S6 N Systems

✔	Step	Item	Recommended Procedure
	1	Console	Verify that the system is switched OFF and unplugged. Clean the console and control panel.
	2	Control Console	Physically inspect the control console for missing or damaged items. Verify the proper illumination of all the control panel buttons.
	3	Probes	Check all probes for wear and tear on the lens, cable, and connector. Look for bent or damaged pins on the connector and in the connector socket on the unit. Verify that the EMI fingers around the probe connector socket housing are intact. Check the probe locking mechanism and probe switch.
	4	LCD Display	Clean the LCD display by gently wiping with a dry, soft, lint-free non-abrasive folded cloth. Inspect the monitor for scratches and raster burn.
	5	Fans	Turn on the system and verify that the system's cooling fans and peripheral fans are operating.
	6	Rear Panel	Check the rear panel connectors for bent pins, loose connections and loose or missing hardware. Screw all the cable connectors tightly to the connector sockets on the panel. Verify that the labeling is in good condition.
	7	Covers	Check that all screws are tightly secured in place, that there are no dents or scratches and that no internal parts are exposed.
	8	Peripherals	Check and clean the peripherals in accordance with the manufacturer's directions. To prevent EMI or system overheating, dress the peripheral cables inside the peripheral cover.
	10	Probe Holders	Clean the gel wells with warm water and a damp cloth to remove all traces of gel.
	13	Covers	Check that all screws are in place, all chassis and internal covers are installed.
	14	Peripherals	Check and clean the peripherals in accordance with the manufacturer's directions. To prevent EMI or system overheating, dress the peripheral cables inside the peripheral cover.
	15	AC System	Check the AC board connectors and the associated cabling for good connection and proper insulation. Verify that the connections are secured.
	16	Power Cord	Check the power cord for cuts, loose hardware, tire marks, exposed insulation, or any deterioration. Verify continuity. Tighten the clamps that secure the power cord to the unit and the outlet plug to the cord. Replace the power cord and/or clamp, as required. 
	17	Front Castors	Check that the front castors can roll and swivel, and can be placed in the locked position by pressing the foot brake (lower lever) *down* on each. Ensure that the wheels are locked and there is no movement in any direction.
	18	Rear Castors	Check that the front castors can roll and swivel, and can be placed in the locked position by pressing the foot brake (lower lever) *down* on each. Ensure that the wheels are locked, unable to swivel *left* or *right*, and that there is no movement *forwards* or *backwards*.

3-4-3-2 Front View of the Vivid S5 N or Vivid S6 N Ultrasound Unit

Figure 3-10 "Front and Side View of the Vivid S5 N or Vivid S6 N Ultrasound Scanner" on page 3-17 shows the Vivid S5 N or Vivid S6 N ultrasound unit components that are visible from the *front* and *side* of the ultrasound unit.

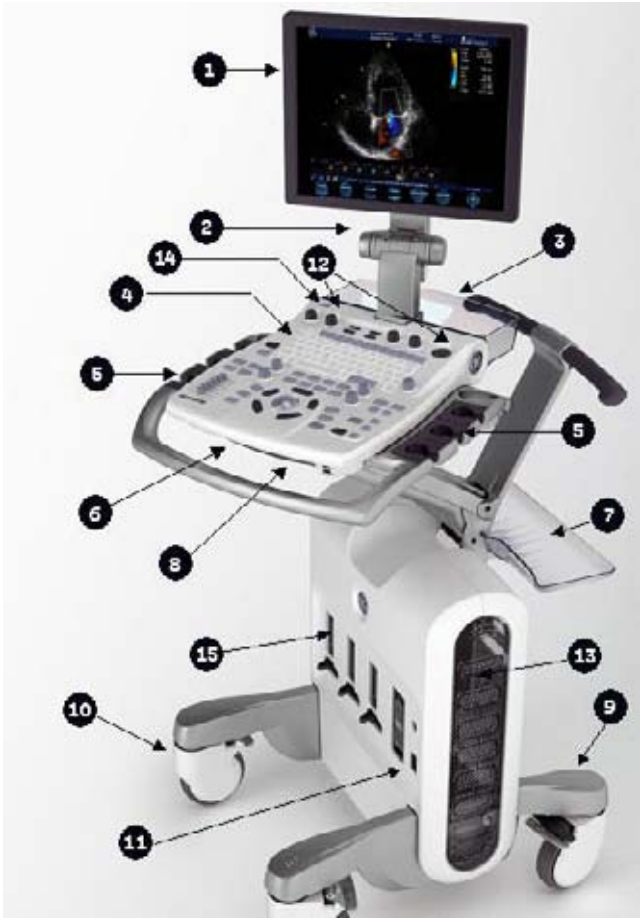


Figure 3-10 Front and Side View of the Vivid S5 N or Vivid S6 N Ultrasound Scanner

1	**Display Monitor:**	Tilts *up* and *down* and swivels *left* and *right*.
2	**Monitor Release pin:**	Enables locking of the monitor in the 90 degree position
3	**Rear Basket:**	Holds paper and other utensils that may be required
4	**Control Panel**	Contains the alphanumeric keyboard and the buttons used to operate the ultrasound unit.
5	**Probe holders:**	Provides a safe, rubber-cushioned resting place for probes.
6	**Control Panel swivel release handle:**	Enables locking of the control panel in position; swivelling it *left* or *right*.
7	**Rear shelf (tray):**	Provides a surface that may be used for external peripherals. Note: the rear shelf should be used only for small-footprint items of a total weight not exceeding 1 Kg (2.2 lbs).

3-4-3-2 Front View of the Vivid S5 N or Vivid S6 N Ultrasound Unit (cont'd)

8 Control Panel up/down release handle:
Enables locking of the control panel in position, or changing the location of the arm by moving it *upwards* and away from the user, or *downwards* and away from the system. This provides leg room for the user who may then be seated beside the system.

9 Rear Caster: Enables locking of swivel motion, or free rolling and swivelling.

10 Front Caster: Enables full-locking of swivel motion, or free rolling and swivelling.

11 ECG Connector: Provides External ECG input connection to an ECG monitor device outlet, or direct patient three-contact ECG lead connection.
Important: Do not use the Vivid 7 ECG cable with the Vivid S5 N or Vivid S6 N system.

12 Speakers: Two loudspeakers provided for Doppler sound.

13 Air inlet and Subwoofer:
Air flow is via a built-in filter on the side cover, for system air cooling. A subwoofer speaker provides superb sound.

14 ON/OFF: Power ON/OFF knob enables the user turn ON the system (when power is connected and the system is either in *Shutdown* or *Standby* mode).

15 Probe ports:
Vivid S6 N system:
5 active probe connectors (one for a pencil probe, and one Logiq-type for TEE probes).

Vivid S5 N system:
4 active probe connectors (one for a pencil probe)

3-4-3-3 Rear View of the Vivid S5 N or Vivid S6 N Ultrasound Unit

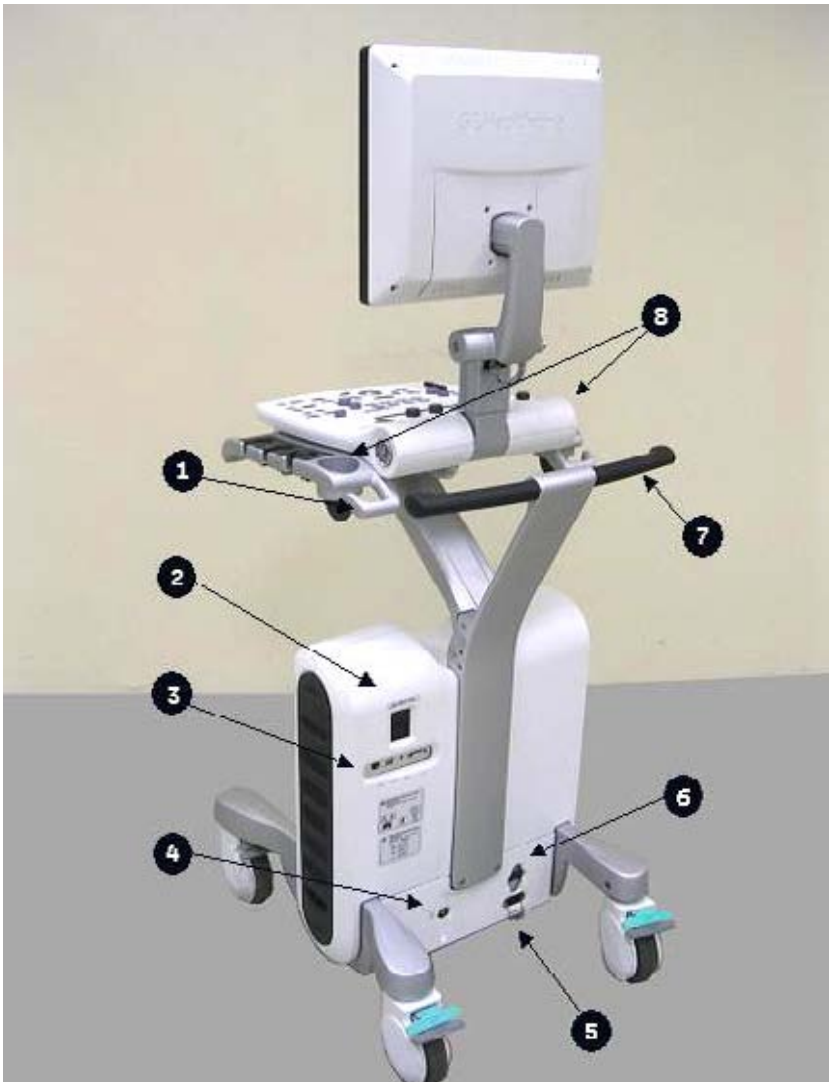


Figure 3-11 Vivid S5 N or Vivid S6 N Rear View

1	**Rear Cable Hooks:**	Provides a cable management solution for probes and ECG leads.
2	**AC Outlet:**	Two isolated AC outlets for peripherals attached to the scanner.
3	**I/O panel:**	Provides LAN, DVI, Audio and 2 USB 2.0 ports.
4	**Ground:**	Detachable Ground plug.
5	**Main AC IN:**	Main AC input plug, secured by a safety spring.
6	**Main Circuit Breaker:**	Provides power to the scanner.
7	**Rear Handle:**	Used to pull/push the scanner and place it in the desired position.
8	**Gel Holders:**	Provides convenient storage for US Gel bottles. Holders are situated on either side of the control console, and on the top surface on either side of the monitor.

3-4-3-4 Rear panel of the Vivid S5 N or Vivid S6 N Ultrasound Unit

Figure 3-12 "View of the Vivid S5 N or Vivid S6 N Rear Panel" on page 3-20 shows a view of the Vivid S5 N or Vivid S6 N ultrasound unit rear panel and external peripheral/accessory connectors:

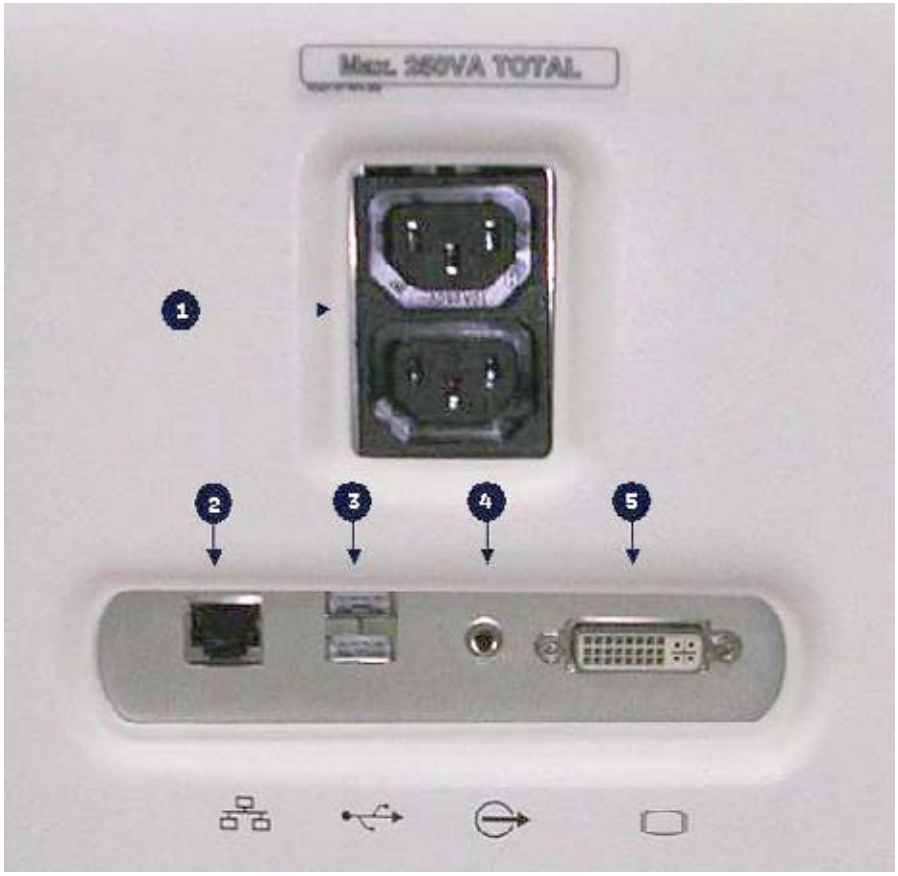


Figure 3-12 View of the Vivid S5 N or Vivid S6 N Rear Panel

1 Peripherals 230VA AC outlet, isolated - provides power to external peripherals connected to scanner.

2 LAN 10/100 Base-TX Ethernet network connector.

3 Two interchangeable USB ports (for digital printer, MOD and other peripherals).

4 Audio outlet.

5 DVI Output (VCR option or CRT monitor option).

3-4-4 System Voltage Confirmation

3-4-4-1 System Voltage Settings

Verify that the Vivid S5 N or Vivid S6 N ultrasound scanner is set to the correct voltage. The voltage settings are found on the system rear cover.

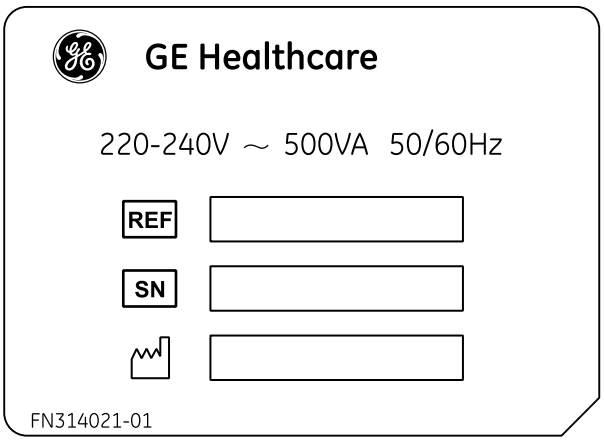


Figure 3-13 Safety Rating Plate - Example

WARNING Connecting the unit to the wrong voltage level will most likely destroy the scanner.

3-4-5 Ensuring Protection from EMI

The Vivid S5 N or Vivid S6 N unit has been designed to minimize the effects of Electro-Magnetic Interference (EMI). Many of the covers, shields, and screws are provided primarily to protect the system from image artifacts caused by this interference. For this reason, it is imperative that all covers and hardware are installed and secured before the unit is put into operation.

Ensure that the system is protected from electromagnetic interference (EMI), as follows:

- Operate the system at least 15 feet away from equipment that emits strong electromagnetic radiation.
- Operate the system in an area enclosed by walls, floors and ceilings comprised of wood, plaster or concrete, which help prevent EMI.
- Shield the system when operating it in the vicinity of radio broadcast equipment, if necessary.
- Do not operate mobile phones or other EMI emitting devices in the ultrasound room.
- Verify that all EMI rules listed in the following table are followed:

NOTE: The Vivid S5 N and Vivid S6 N ultrasound unit is approved for use in hospitals, clinics and other environmentally qualified facilities, in terms of the prevention of radio wave interference. Operation of the ultrasound unit in an inappropriate environment can cause electronic interference to radios and television sets situated near the medical equipment.

Table 3-7 EMI Prevention/ Abatement

EMI Rule	Details
Ground the unit.	Poor grounding is the most likely reason an ultrasound unit will have noisy images. Check the grounding of the power cord and power outlet.
Be aware of RF sources.	Keep the unit at least 5m (16.4 ft) away from other EMI sources. Special shielding may be required to eliminate interference problems caused by high frequency, high powered radio or video broadcast signals.
Replace and/or reassemble all screws, RF gaskets, covers and cores.	After you finish repairing or updating the system, replace all covers and tighten all screws. Any cable with an external connection requires a magnet wrap at each end. Install the shield over the front of the card cage. Loose or missing covers or RF gaskets allow radio frequencies to interfere with the ultrasound signals.
Replace broken RF gaskets.	If more than 20% or a pair of the fingers on an RF gasket are broken, replace the gasket. Do not turn on the unit until any loose metallic part is removed and replaced if needed.
Do not place labels where RF gaskets touch metal.	Never place a label where RF gaskets meet the unit. Otherwise, the gap created will permit RF leakage. In case a label has been found in such a location, move the label to a different appropriate location.
Use GE specified harnesses and peripherals.	The interconnect cables are grounded and require ferrite beads and other shielding. Cable length, material, and routing are all important; do not make any changes that do not meet all specifications.
Take care with cellular phones.	Cellular phones may transmit a 5 V/m signal that causes image artifacts.
Properly address peripheral cables.	Do not allow cables to lie across the top of the card cage or hang out of the peripheral bays. Loop any peripheral cable excess length inside the peripheral bays or hang on the hooks provided below the console. Attach the monitor cables to the frame.

Section 3-5
Completing the Hardware Installation

3-5-1 Connecting Peripherals

NOTE: All peripherals mounted on the Vivid S5 N or Vivid S6 N system must be firmly secured in position using the securing straps supplied with the scanner. These straps are fastened through the dedicated holes located on each side of the rear tray and serve to hold the peripheral firmly in place.

3-5-1-1 Wireless Network Adaptor

NOTICE **IMPORTANT During Stand-by mode, it is NOT recommended to *introduce* or *remove* USB devices; this may cause the system to lock-up during the boot-up procedure**.

The Wireless Network adaptor should be connected to the lower USB socket on the Vivid S5 N or Vivid S6 N rear connectors panel.

One can connect the Wireless Network adaptor either once the system is powered ON, or after shutdown. All software drivers for the Wireless Network are pre-installed for the designated Wireless Network adaptor only. Follow the procedure described in the 3-7-2-4 "Wireless Network Configuration" on page 3-83.

WARNING ***Do not attempt to use a different type of Wireless Network adaptor. The ultrasound system is an extremely sensitive and complex medical system. Any unauthorized peripherals may cause system failure or damage!***

3-5-1-2 MOD Drive

NOTICE **IMPORTANT During Stand-by mode, it is NOT recommended to *introduce* or *remove* USB devices; this may cause the system to lock-up during the boot-up procedure**.

Figure 3-14 MOD Drive

The MOD Drive can be connected to either of the USB ports (*upper* or *lower*) on the rear connectors panel. This connection must be via a USB-to-SCSI adaptor; one side of the adaptor being connected to the USB port, and the other side to the rear of the MOD drive.

3-5-1-2 MOD Drive (cont'd)

One must use the additional power source to activate the MOD Drive. However, this must be powered from the scanner itself, via one of the isolated peripheral power outlets provided on the rear panel of the scanner.

The MOD Drive may be connected once the system is powered ON, or after shutdown. All software drivers for the MOD Drive are pre-configured and installed designated to be used with the specific MOD drive supplied by GE HEALTHCARE.

WARNING ***Do not attempt to use a different type of mass storage device other than the MOD Drive supplied with the system. The ultrasound system is an extremely sensitive and complex medical system. Any unauthorized peripherals may cause system failure or damage!***

3-5-1-3 USB Memory Stick

NOTICE **IMPORTANT During Stand-by mode, it is NOT recommended to *introduce* or *remove* USB devices; this may cause the system to lock-up during the boot-up procedure**.

The USB Memory Stick may be connected to either of the USB ports on the keyboard, or on the rear connectors panel.

The USB Memory Stick can be connected once the system is powered ON, or after shutdown. All software drivers for the USB Memory Stick are pre-installed on the system. The system is capable of detecting and working with other types of memory sticks. However, it is highly recommended to use the memory stick that is provided and approved by GE HEALTHCARE. Other memory sticks may be sensitive to EMC interference (this may affect system performance and/or image quality) or may not be recognized by the system.

3-5-1-4 Connecting the Black & White Printer

NOTICE **IMPORTANT During Stand-by mode, it is NOT recommended to *introduce* or *remove* USB devices; this may cause the system to lock-up during the boot-up procedure**.

Figure 3-15 Black and White Printer

3-5-1-4 Connecting the Black & White Printer (cont'd)

The B/W Printer connection in the different scenarios is explained below.

NOTE: After physical connection of the printer to the system, to configure the appropriate hot keys to activate printing direct from the control panel, follow the instructions in 3-5-1-6 "Configuring Printing Buttons P1 and P2" on page 3-28.

The ultrasound scanner has a designated B&W printer compartment located on the right side of the system. When using a B&W printer with the scanner, after installation make sure the correct side cover kits have been order for the Vivid S5 N or Vivid S6 N system, as appropriate:

- Vivid S6 N = P/N S2421612
- Vivid S5 N = P/N S2421611

The B&W Printer should connected to a designated USB port on the DIB board, as indicated in Figure 3-16 "Cables Connected to DIB Box" on page 3-25.

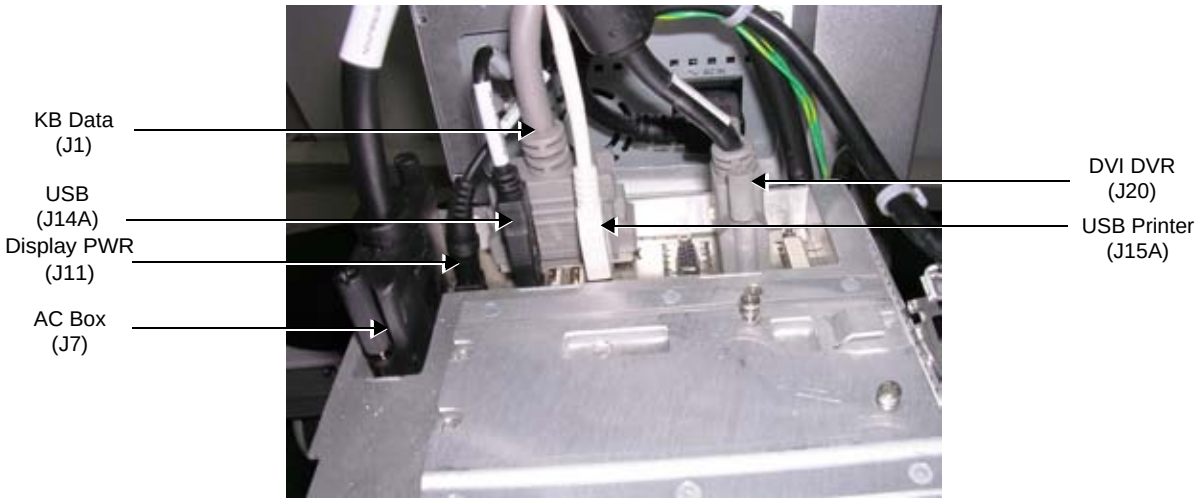


Figure 3-16 Cables Connected to DIB Box

NOTE: Refer also to the schematic diagram in Figure 3-17 "Schematic Diagram of Internal Cables and Connectors" on page 3-26.

3-5-1-4 Connecting the Black & White Printer (cont'd)

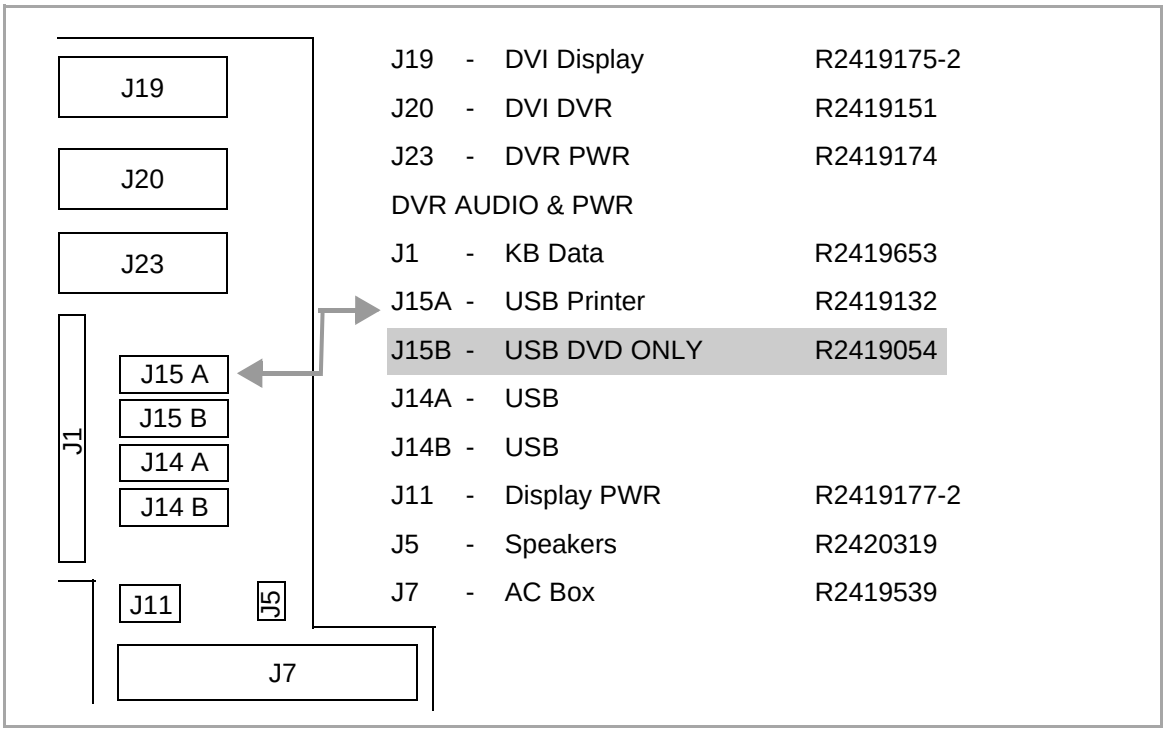


Figure 3-17 Schematic Diagram of Internal Cables and Connectors

In addition, a dedicated power source and cable is provided within the dedicated B&W printer compartment.

The B/W Printer should be connected once the system is powered OFF.
All software drivers for the B/W Printer are pre-configured and installed designated to be used with the specific B/W Printer supplied by GE HEALTHCARE.

WARNING ***Do not attempt to use a different type of B/W Printer (brand or model) other than the B/W Printer provided by GE HEALTHCARE. The ultrasound system is an extremely sensitive and complex medical system. Any unauthorized peripherals may cause system failure or damage!***

3-5-1-5 Connecting the Digital Color Printer

NOTICE **IMPORTANT During Stand-by mode, it is NOT recommended to *introduce* or *remove* USB devices; this may cause the system to lock-up during the boot-up procedure**.

NOTE: After physical connection of the printer to the system, to configure the appropriate hot keys to activate printing direct from the control panel, follow the instructions in 3-5-1-6 "Configuring Printing Buttons P1 and P2" on page 3-28.

Figure 3-18 Digital Color Printer

The Digital Color Printer can be connected to either of the USB ports (*upper* or *lower*) on the rear connectors panel.

One must use the additional power source to activate the Digital Color Printer. However, this must be powered from the scanner itself, via one of the isolated peripheral power outlets provided on the rear connectors panel.

The Digital Color Printer can be connected once the system is powered ON, or after shutdown. All software drivers for the Digital Color Printer are pre-configured and installed designated to be used with the specific Digital Color Printer supplied by GE HEALTHCARE.

WARNING ***Do not attempt to use a different type of Digital Color Printer (brand or model) other than the Digital Color Printer provided by GE HEALTHCARE. The ultrasound system is an extremely sensitive and complex medical system. Any unauthorized peripherals may cause system failure or damage!***

3-5-1-6 Configuring Printing Buttons P1 and P2

Buttons P1 and P2 on the Vivid S5 N and Vivid S6 N operator consoles are used to activate the printer directly from the console, as follows:

- Button P1 should be specifically configured independently to activate the Windows default printer. By default, button P1 is designated to activate the Windows default printer. The printer that is associated with the P1 button should be defined as the default printer via the Windows screens.
- Button P2 (which is fully configurable) should be separately configured to activate a second printer.

3-5-1-6-1 P1 and P2 Hot Key Configuration via Vivid Vivid S5 N and Vivid S6 N Connectivity Settings

1.) Press **Config** (or F2).
2.) Select **Connectivity** (in the lower part of window).
3.) Select the **Additional Outputs** tab.

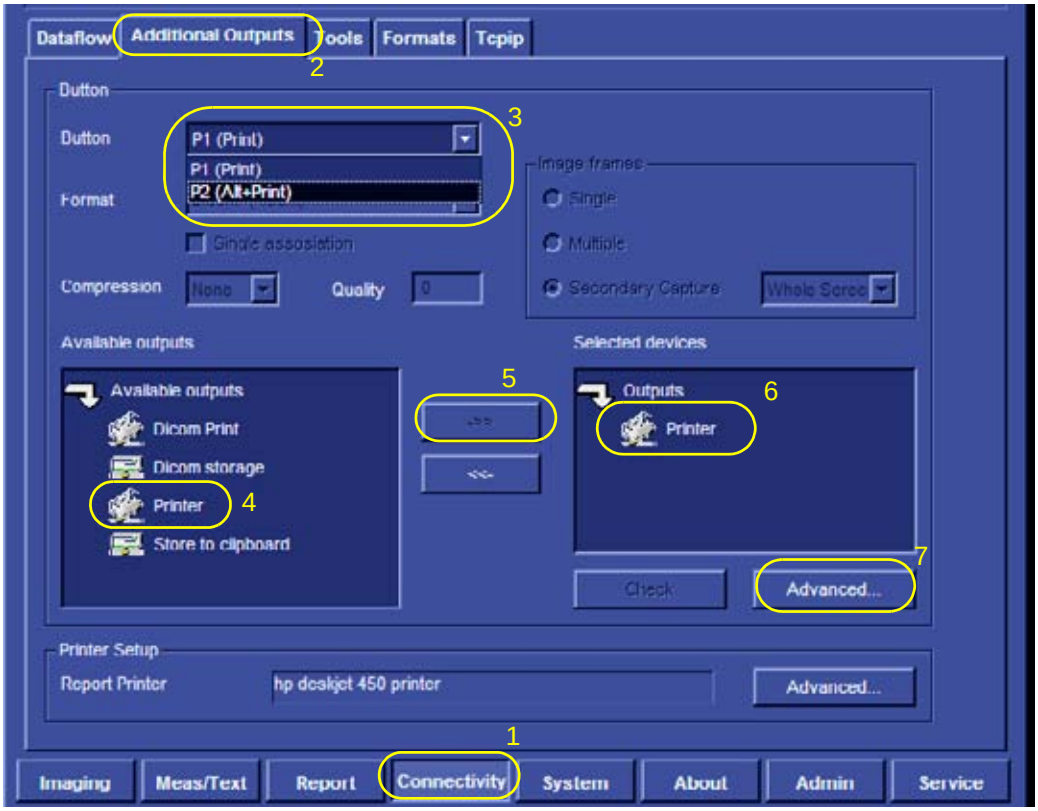


Figure 3-19 Configuring Control Panel Hot Keys for Printing

4.) From the Button drop-down menu (see Figure 3-19 "Configuring Control Panel Hot Keys for Printing" on page 3-28), select the button to be configured - either the **P1 (Print)** button or **P2 (Alt+Print)** to activate a variety of outputs.
5.) Use the *left* or *right* arrows below to add any of the available options (listed on the left) as **Outputs** (listed on right).
6.) From the listed **Outputs**, select (highlight) the required output, and select **Advanced** to configure the output device accordingly.

3-5-1-6 Configuring Printing Buttons P1 and P2 (cont'd)

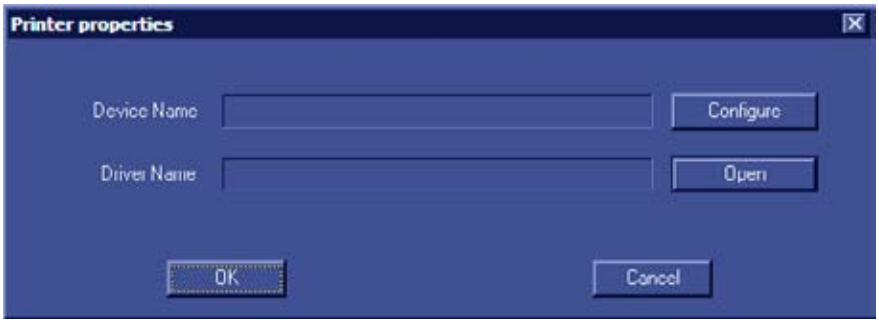


Figure 3-20 Printer Properties Screen

7.) Select **Configure.**

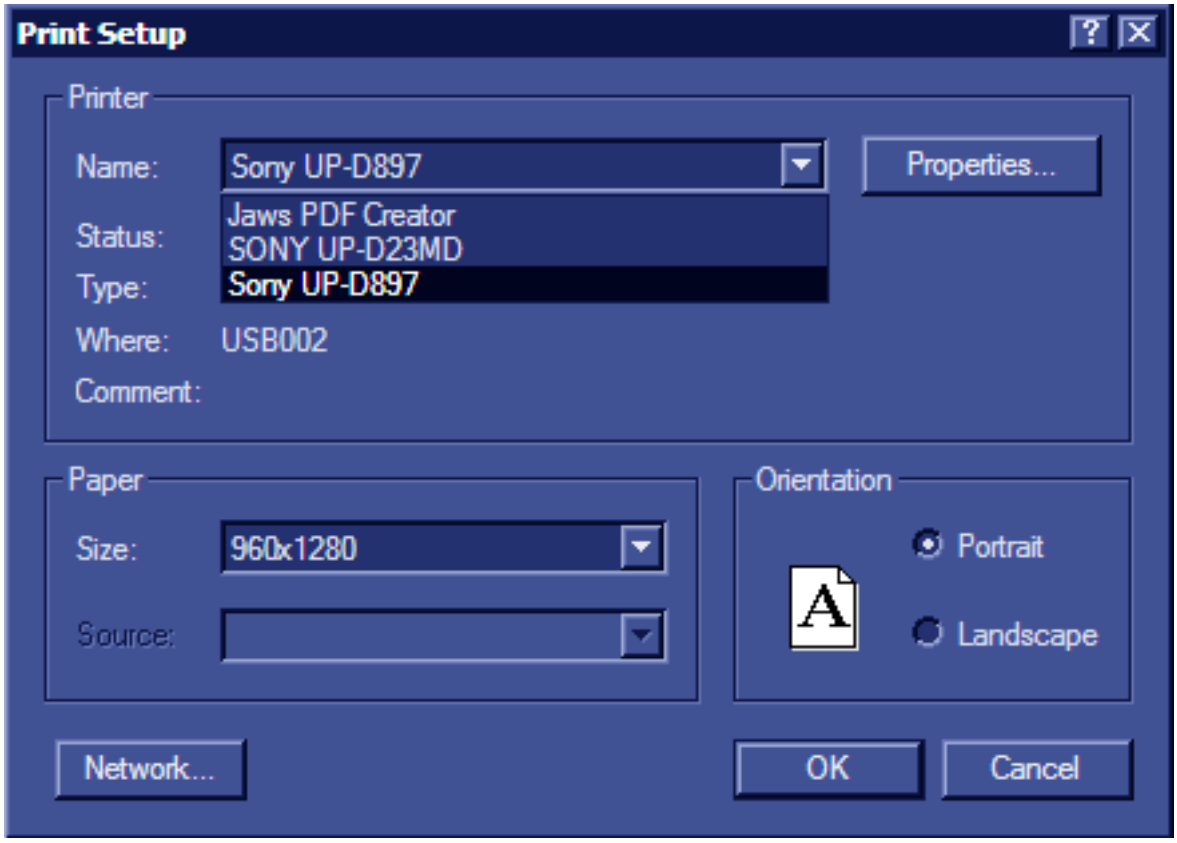


Figure 3-21 Printer Setup Screen

8.) From the drop-down menu, select the desired printer and press **OK**.

9.) In the Printer Properties window, select **OK.**

Printing may now be activated direct from the Control Panel, using the hot key you have configured for this purpose.

3-5-1-6-2 P1 Button Configuration via the Windows Control Panel

NOTE: If a customer has more than one printer and prefers to configure button P1 to activate a non-configured printer, the non-configured printer must be configured as the default printer via the Windows Control Panel, as described below.

The Sony UP-897 printer is used as **an example** in the following procedure.

1.) Press **Config** (or F2).
2.) Select **Connectivity** (in the lower part of window).
3.) From the **Connectivity** screen click the **Tcpip** tab.

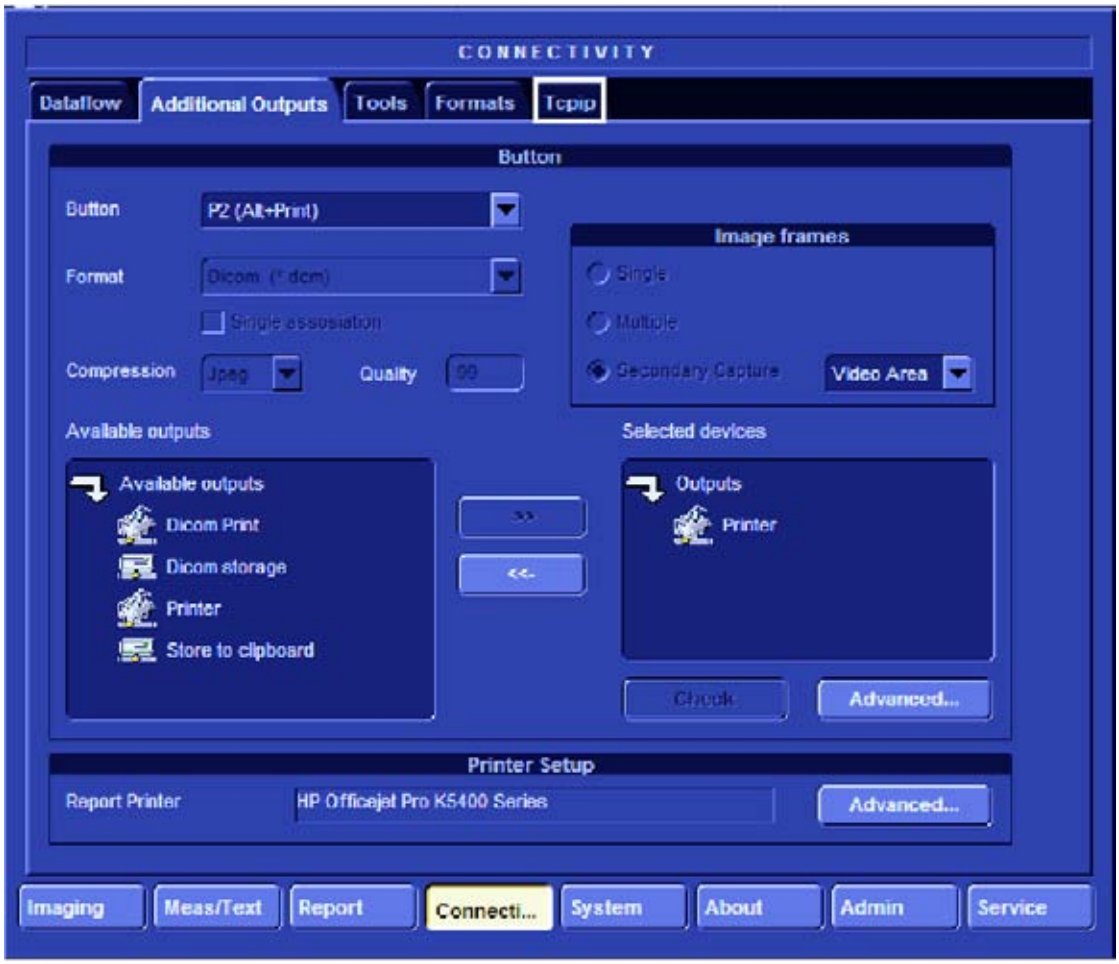


Figure 3-22 Additional Outputs Screen

3-5-1-6-2 P1 Button Configuration via the Windows Control Panel (cont'd)

4.) In the Tcpip window, click Advanced Settings.

Figure 3-23 Tcpip Tab Activated

The Network Connection screen opens as seen in Figure 3-24 below.

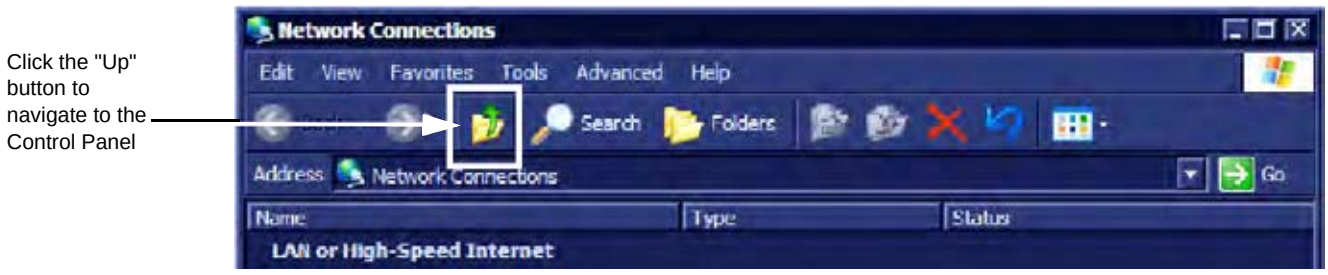


Figure 3-24 Network Connections showing Highlighted "Up One Level" Button

5.) Click the "Up" button to open the Windows Control Panel.

6.) Navigate to **Printers and Faxes** and double-click the printer that you want to choose (**Sony UP-D897** in this example).

This opens the Printer Configuration dialog (Sony UP-D897 in this example - see Figure 3-25 "Printer Configuration Dialog Box Showing Set Default Printer" on page 3-32).

3-5-1-6-2 P1 Button Configuration via the Windows Control Panel (cont'd)

7.) From the menu, select Printer and select the Set As Default Printer option to select the printer as the default printer or verify that the printer is the set as the default.

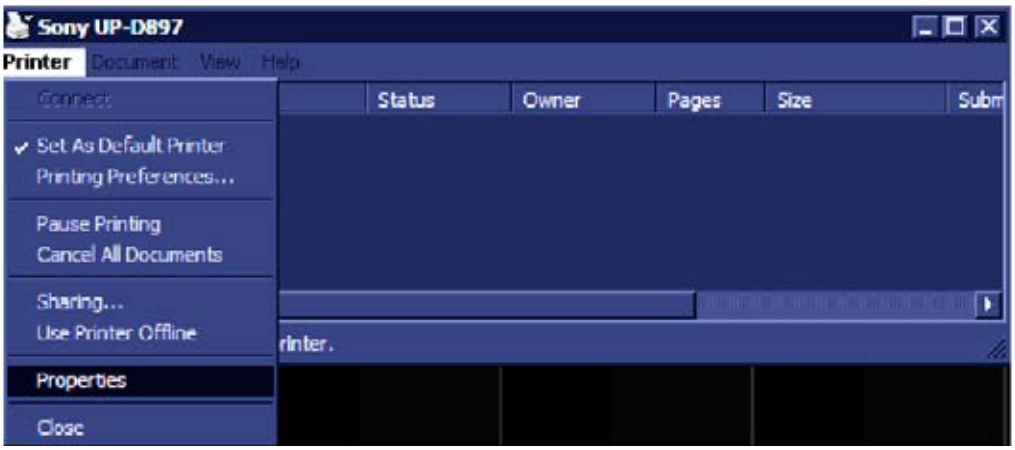
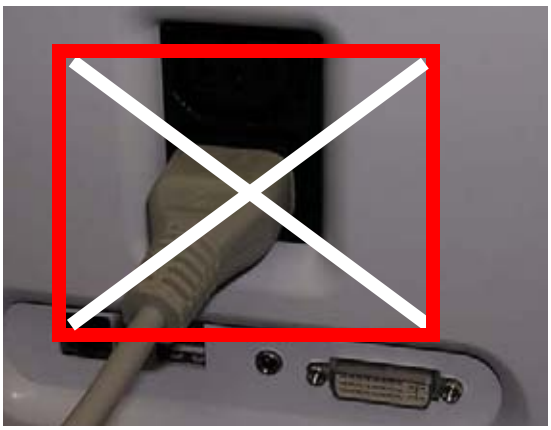


Figure 3-25 Printer Configuration Dialog Box Showing Set Default Printer

3-5-1-7 Connecting the HP network printer - CP2025n

Figure 3-26 HP CP2025n printer

⚠ **WARNING** ***The HP CP2020n printer must be connected directly to a mains AC power outlet and not via the rear AC port on the VS5 N & VS6 N system.***



⚠ **WARNING** ***When connecting the printer's network cable, ensure that it is connected to the network port at the rear of the Vivid S5/S6 system as shown in the picture below:***

3-5-1-7 Connecting the HP network printer - CP2025n (cont'd)

Configuring of the HP network printer, model CP2025n, requires configuring the IP addresses for the Vivid S5/S6 system and for the printer. There are two types of installations:

- "Peer-to-Peer" using a cross communication cable between the system and the printer
- Printer installation on a network (e.g. a hospital network)

Peer-to-Peer Configuration

A) Defining the system's IP address:

1.) Using a service dongle, boot up the system in maintenance mode and exit to Windows Desktop.
2.) Click **Start > Control Panel** and navigate to Network Connections.
3.) In the Network Connections screen, select **Local Area Connection 2**.

Figure 3-27 Select Local Area Connection 2.

4.) On the console, press **Update/Menu** to access the context menu and then click **Properties**.

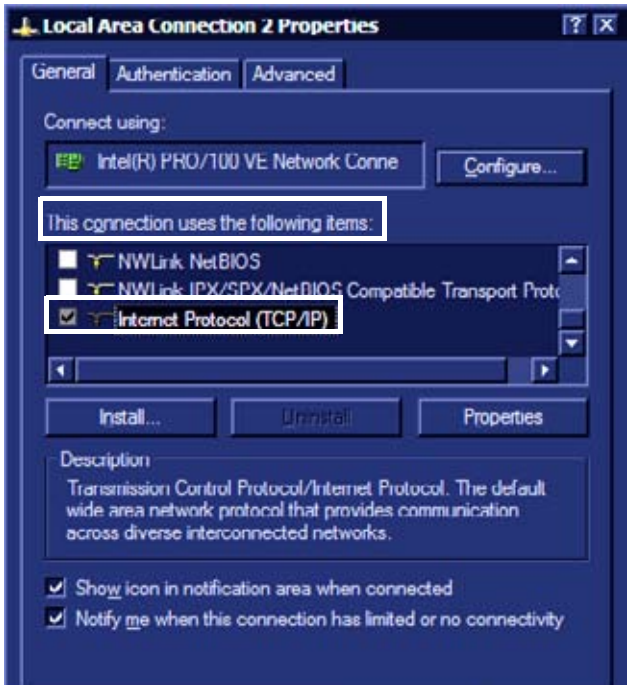

Local Area Connection 2 Properties
General Authentication Advanced
Connect using:
Intel(R) PRO/100 VE Network Conne
Configure...
This connection uses the following items:
NWLink NetBIOS
Internet Protocol (TCP/IP)
Install... Uninstall Properties
Description
Transmission Control Protocol/Internet Protocol. The default wide area network protocol that provides communication across diverse interconnected networks.
Show icon in notification area when connected
Notify me when this connection has limited or no connectivity

Figure 3-28 Local Are Connection 2 Properties

3-5-1-7 Connecting the HP network printer - CP2025n (cont'd)

5.) From "This connection uses the following items" scroll box, select **Internet Protocol (TCP/IP)** and click **Properties**. The Internet Protocol (TCP/IP) Properties screen opens.

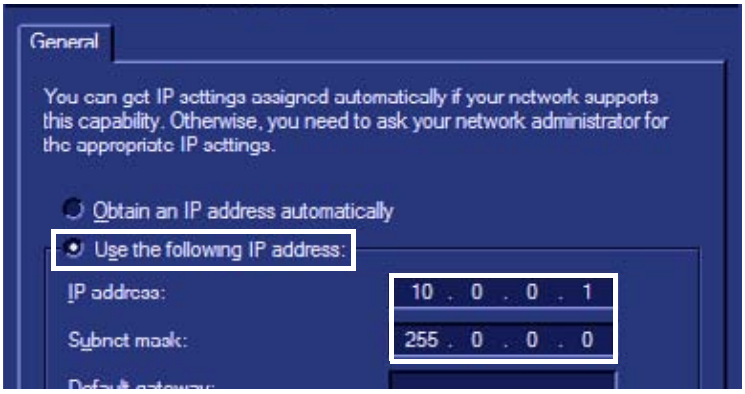

General
You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.
Obtain an IP address automatically
Use the following IP address:
IP address:
10 . 0 . 0 . 1
Subnet mask:
255 . 0 . 0 . 0

Figure 3-29 Use the following IP address

6.) Select **Use the following IP address** and in the IP address field type: **10.0.0.1** and in the Subnet mask field type: **255.0.0.0**.

7.) Click **OK** and click **Close**. The system's IP address is defined.

B) Defining the printer's IP address:

The printer's settings are controlled via the printer's control panel as identified in Figure 1-1 on page 1-1.

The control panel is illustrated Figure 3-30 below:

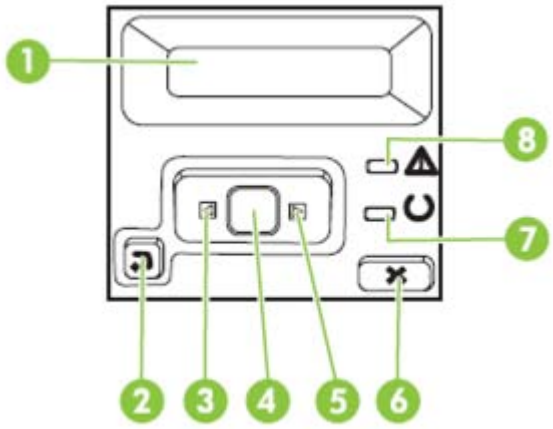


Figure 3-30 CP2025n printer control panel

The printer's control panel is explained in the chart on the following page.

3-5-1-7 Connecting the HP network printer - CP2025n (cont'd)

1	**Control-panel display**: The display provides information about the product. Use the menus on the display to establish product settings.
2	Back arrow (⮌) button: Use this button for the following actions: • Exit the control-panel menus. • Scroll back to a previous menu in a submenu list. • Scroll back to a previous menu item in a submenu list (without saving changes to the menu item).
3	Left arrow (◄) button: Use this button to navigate through the menus or to decrease a value that appears on the display.
4	OK button: Press the OK button for the following actions: • Open the control-panel menus. • Open a submenu displayed on the control-panel display. • Select a menu item. • Clear some errors. • Begin a print job in response to a control-panel prompt (for example, when the message **[OK] to print** appears on the control-panel display).
5	Right arrow (►) button: Use this button to navigate through the menus or to increase a value that appears on the display.
6	Cancel Job (X) button: Press this button to cancel a print job whenever the attention light is blinking or to exit the control-panel menus.
7	Ready light (green): The Ready light is on when the product is ready to print. It blinks when the product is receiving print data.
8	Attention light (amber): The Attention light blinks when the product requires user attention.

Figure 3-31 Printer's Control Panel Explaination

To configure the printer using the control panel, follow these guidelines:

1.) On the printer's control panel, press **OK** (button 4) in Figure 3-30 "CP2025n printer control panel" on page 3-35.

2.) Press the **right arrow** on the control panel four times to display "**Network config**" in the control panel display and press **OK**. "TCP/IP config" appears in the control panel display.

3.) Press **OK** and on the control panel press the **right arrow**. "Manual" displays in the control panel window.

4.) Press **OK**. An IP address displays.

NOTE: For the following step, use the above guidelines to enter the printer's IP address.

5.) Using the control panel's left and right arrow buttons, and the OK button, type in the following IP address: 10.0.0.2.

6.) Press **OK**. "Yes" is displayed in the control panel. Press **OK** again.
The Subnet mask displays: 255.0.0.0

3-5-1-7 Connecting the HP network printer - CP2025n (cont'd)

7.) Press **OK**. Default Gateway displays with an IP address.

8.) Set the IP address to: 0.0.0.0.

9.) Press **OK** twice. The printer's IP address is now configured.

C) Driver Installation:

1.) From Windows desktop, click **Start > Settings** and navigate to Printers.

2.) Click **Add Printer**. The Add Printer wizard opens.

3.) Click **Next twice** and select "**Local Printer Attached to this Computer**".

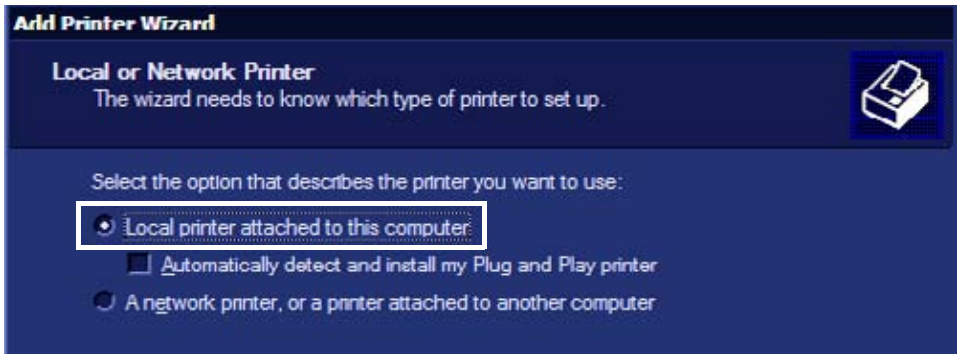

Add Printer Wizard
Local or Network Printer
The wizard needs to know which type of printer to set up.
Select the option that describes the printer you want to use:
Local printer attached to this computer
Automatically detect and install my Plug and Play printer
A network printer, or a printer attached to another computer

Figure 3-32 Select "Local Printer Attached to this Computer"

4.) Click **Next** and select "**Create a new port**".

In the "Type of Port" scrolldown list, select **Standard TCP/IP port.**

5.) Click **Next** and follow the instructions on the screen. Click **Next.**

NOTE: In the following step, you are required to type the printer's IP address. In Peer-to-Peer mode, the address will be: 10.0.0.2.
When installing the printer on a hospital/client network, type the IP address supplied by the institution's IT manager.

6.) In the "Printer Name or IP Address" field, type the printer's IP address: 10.0.0.2. Click **Next** and in the following screen click **Next** again.

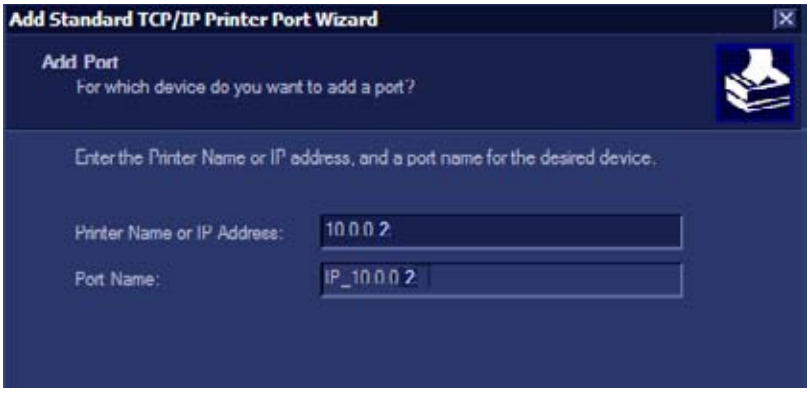

Add Standard TCP/IP Printer Port Wizard
Add Port
For which device do you want to add a port?
Enter the Printer Name or IP address, and a port name for the desired device.
Printer Name or IP Address:
10.0.0.2
Port Name:
IP_10.0.0.2

Figure 3-33 Add standard TCP/IP Printer Port

3-5-1-7 Connecting the HP network printer - CP2025n (cont'd)

Click **Finish**. The Install Printer Software screen opens.

7.) Insert the printer's driver CD into the CD and select "**Have Disk**".
The "Install From Disk" screen opens. Follow the instructions on the screen.

8.) In the "Copy manufacturer's files from" field scrolldown list, select drive **G:** and click **OK**.

*NOTE: When installing the printer on BT10 systems, select the corresponding DVD/HD drive letter and click **OK.***

9.) Click **Next** and follow the instructions on the screen. The "Finish" screen displays.

10.) Print a test page.

NOTE: Wait a few minutes while the system copies the printer drivers.

If the printer does not respond timeously, press the cancel button (button no. 6 in Figure 1-3 above). The printer will print a test page. If the printer does not respond, this could be due to the need to configure the paper size.

Defining the paper size:

1.) From Windows Desktop, navigate to Printers and Faxes and select the HP-CP2025 printer.
2.) From the console, press **Update/Menu** and from the context menu select **Properties**.
3.) Select the required settings and click **OK**.
4.) Print a test page to confirm that the printer is properly installed.

Installing the CP2020n Printer on a Network

To install the CP2020n printer on a network, follow the procedure for "C) Driver Installation:" on page 3-37.

3-5-1-8 Connecting the DeskJet Color Printer

NOTE: This printer is end of life, but may still be used, when available. Network Printer CP2025n has been introduced as a replacement, see: 3-5-1-7 "Connecting the HP network printer - CP2025n" on page 3-33.

NOTICE **IMPORTANT During Stand-by mode, it is NOT recommended to *introduce* or *remove* USB devices; this may cause the system to lock-up during the boot-up procedure**.

Figure 3-34 DeskJet Color Printer

This only applies to HP K5400 models which are supplied pre-installed with the appropriate software drivers. The DeskJet Color Printer can be connected to either of the USB ports (*upper* or *lower*) on the rear connectors panel.

One must use the additional power source to activate the DeskJet Color Printer. However, this must be powered from the scanner itself, via one of the isolated peripheral power outlets provided on the system. A special power cable and AC adaptor are provided with the printer, enabling connection of the printer to the peripherals outlet.

The DeskJet Color Printer can be connected once the system is powered ON, or after shutdown.

WARNING ***Do not attempt to use a different type of DeskJet Color Printer (brand or model) other than the DeskJet Color Printer provided by GE HEALTHCARE. The ultrasound system is an extremely sensitive and complex medical system. Any unauthorized peripherals may cause system failure or damage!***

For instructions on:

- configuring the printer, see 3-5-1-8-1 "Configuring the HP 5400K Printer for Connection Via USB Port" on page 3-40.
- setting the HP Office Pro K5400 as the default printer, see 3-5-1-8-2 "Setting the HP Office Pro K5400 as the Default Report Printer" on page 3-44.

3-5-1-8-1 Configuring the HP 5400K Printer for Connection Via USB Port

1.) Log in to Windows® with Administrator permission.

2.) On the console, press the **Config** button (or F2) and click the **Service** tab at the bottom of the screen.

3.) From the **Network Printer** dialog box select the **HP K5400** printer.

4.) Click **Start Setup Program** and follow the on-screen installation wizard instructions.

5.) Proceed as follows:

- If the software has not been installed, the HP installation wizard requests you to accept the installation. Follow the instructions on the screen. Proceed to step 6 below to connect via a USB cable.
- If the screen displays **The Software has already been installed on your computer** as shown in Figure 3-35, then select the option to **Add a device** and click **Next**.

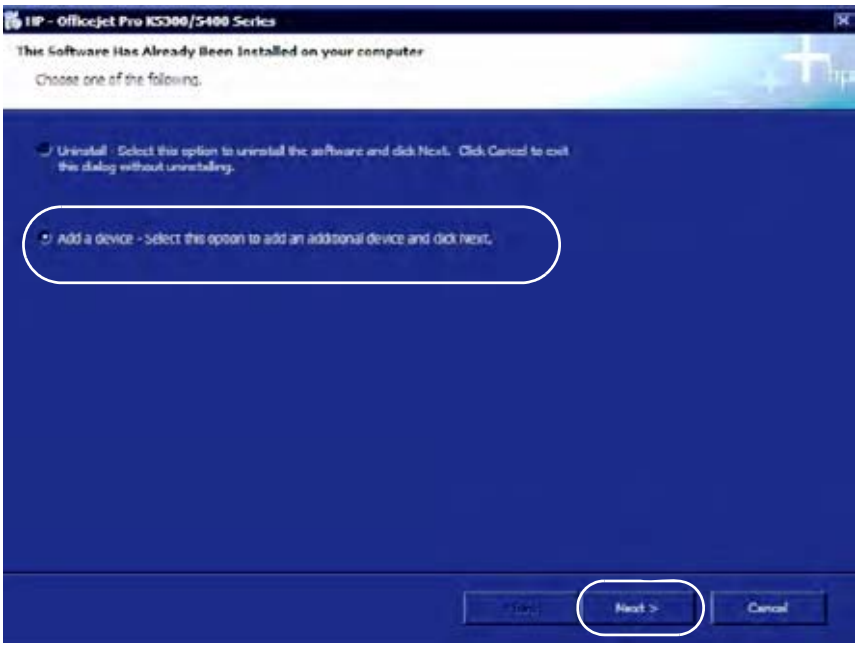

HP - Officejet Pro K5300/5400 Series
The Software Has Already Been Installed on your computer
Choose one of the following.
Uninstall - Select this option to uninstall the software and click Next. Click Cancel to exit the dialog without uninstalling.
Add a device - Select this option to add an additional device and click Next.
< Back
Next >
Cancel

Figure 3-35 Adding a Device

3-5-1-8-1 Configuring the HP 5400K Printer for Connection Via USB Port (cont'd)

6.) Select the USB cable option for connecting the device to the computer, then click **Next** - see Figure 3-36.

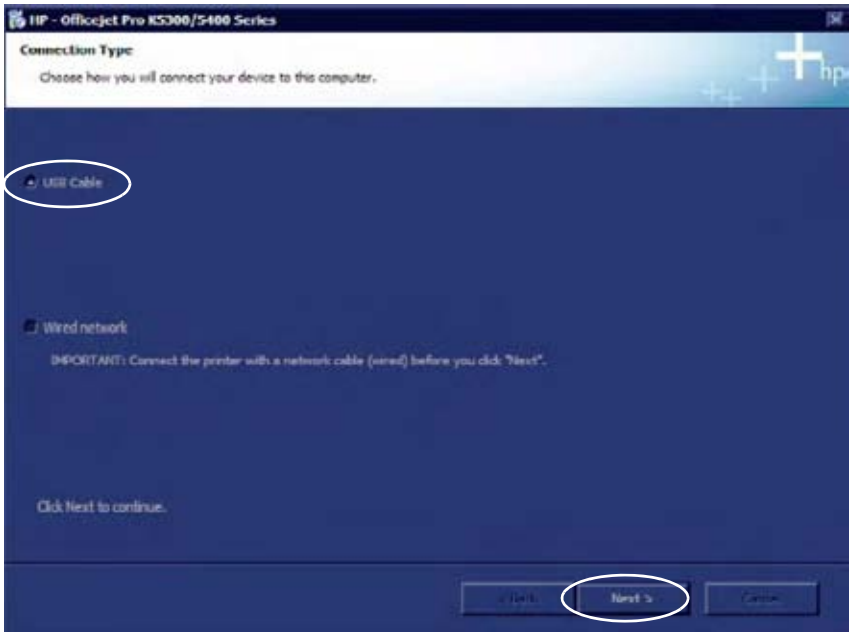

HP - Officejet Pro K5300/5400 Series
Connection Type
Choose how you will connect your device to this computer.
USB Cable
Wired network
IMPORTANT: Connect the printer with a network cable (wired) before you click "Next".
Click Next to continue.
Next >

Figure 3-36 Connecting via USB Cable

7.) Follow the instructions on the **Connect Your Device Now** screen, (Figure 3-37). Place a check mark in the option at the bottom of the screen indicating that you are unable to currently connect the device.

HP - Officejet Pro K5300/5400 Series
Connect Your Device Now
1. Make sure the device is powered on.
2. Connect the USB cable.
If you are unable to connect your device now, click this box and then click Next to finish installing the software. You can connect your device later.
Help
< Back
Next >

Figure 3-37 Connecting the device to the computer

3-5-1-8-1 Configuring the HP 5400K Printer for Connection Via USB Port (cont'd)

8.) **Click Next**. The Service screen opens.

9.) From the Service screen, click the **Connectivity** tab and select **Additional Outputs** as shown in Figure 3-38.

10.) Verify that the Report Printer, HP Office Pro K5400 is installed. This indicates that the printer has been successfully installed.

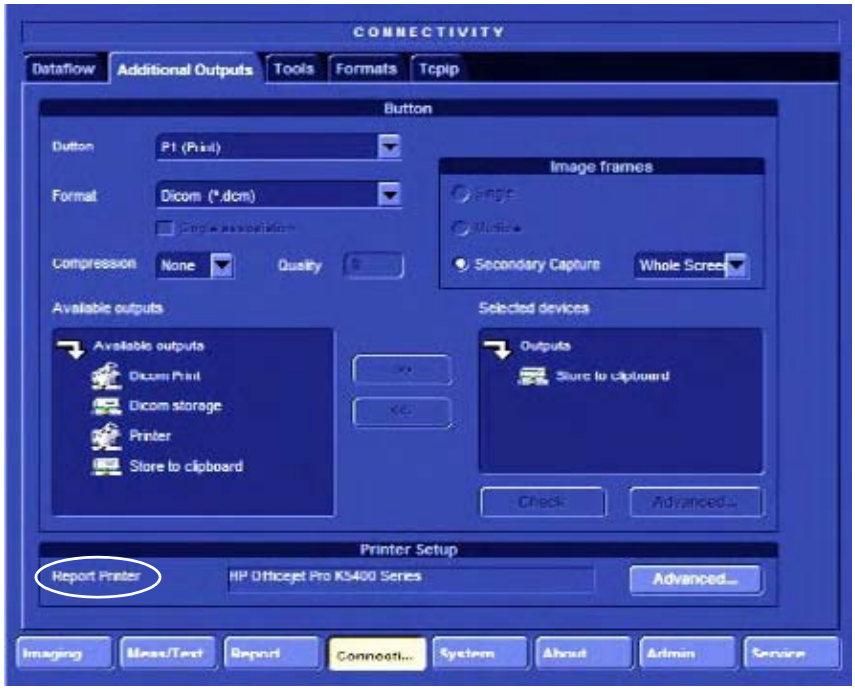


Figure 3-38 Connectivity Screen

11.) If the **HP Office Pro K5400** does not appear as the Report Printer, click **Advanced...** at the bottom of the Connectivity screen. The Printer Properties screen opens - Figure 3-39.

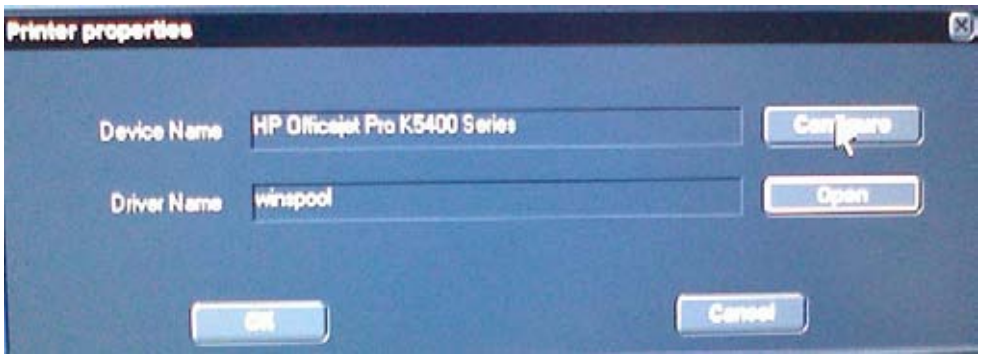


Figure 3-39 Printer Properties

12.) Click **Configure**. The **Print Setup** screen opens.

13.) From the printer scroll-down list select the **HP Office Pro K5400** printer. Click **OK**, and in the following screen click **OK**.

The printer is now installed.

3-5-1-8-1 Configuring the HP 5400K Printer for Connection Via USB Port (cont'd)

14.) Print a test page and inspect the result to verify that the printer operates correctly.

15.) Proceed to perform the following functionality tests:

- 4-3-2-1 "B/W and Color Printer Test" on page 4-32
- 4-3-2-2 "Color Printer Test" on page 4-32

3-5-1-8-2 Setting the HP Office Pro K5400 as the Default Report Printer

1.) Press **Config** (or F2).
2.) Select **Connectivity** (in the lower part of window).
3.) Select the **Additional Outputs** tab.

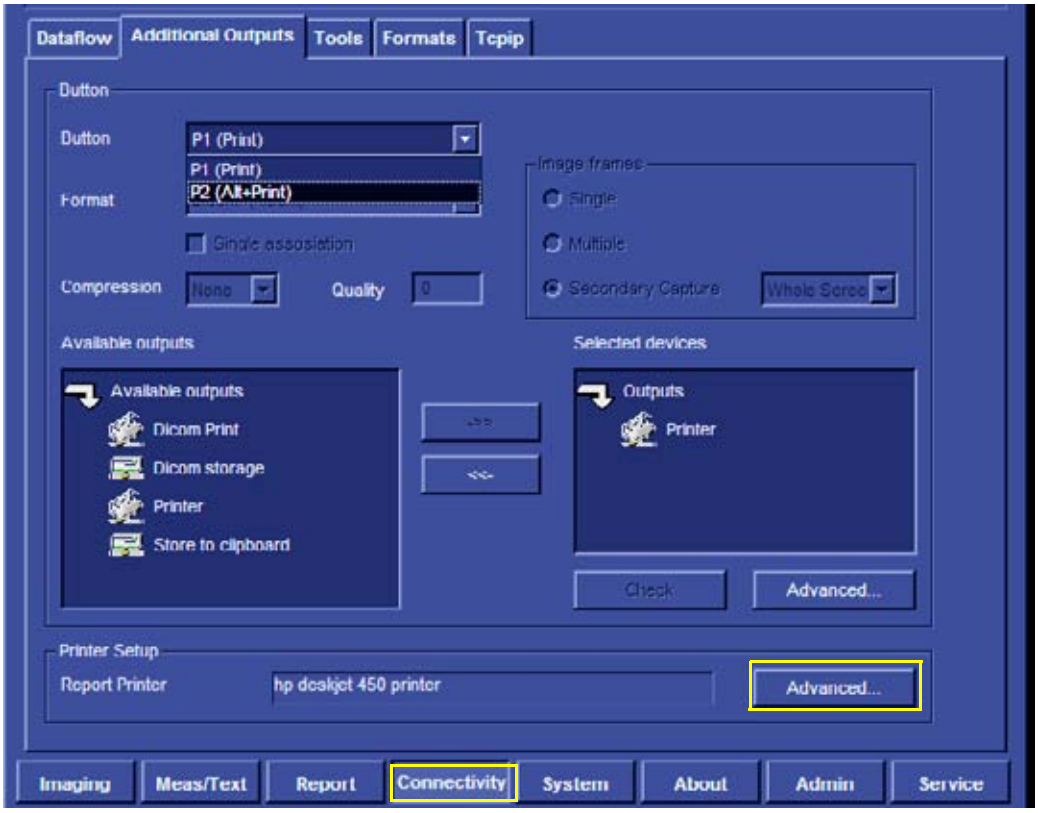


Figure 3-40 Configuring Control Panel Hot Keys for Printing

4.) From the **Printer Setup** controls, select **Advanced**.

The Printer Properties dialog opens:.

Figure 3-41 Printer Properties Screen

5.) Select **Configure**.

The Print Setup dialog opens (Figure 3-42 "Printer Setup Screen" on page 3-45).

3-5-1-8-2 Setting the HP Office Pro K5400 as the Default Report Printer (cont'd)

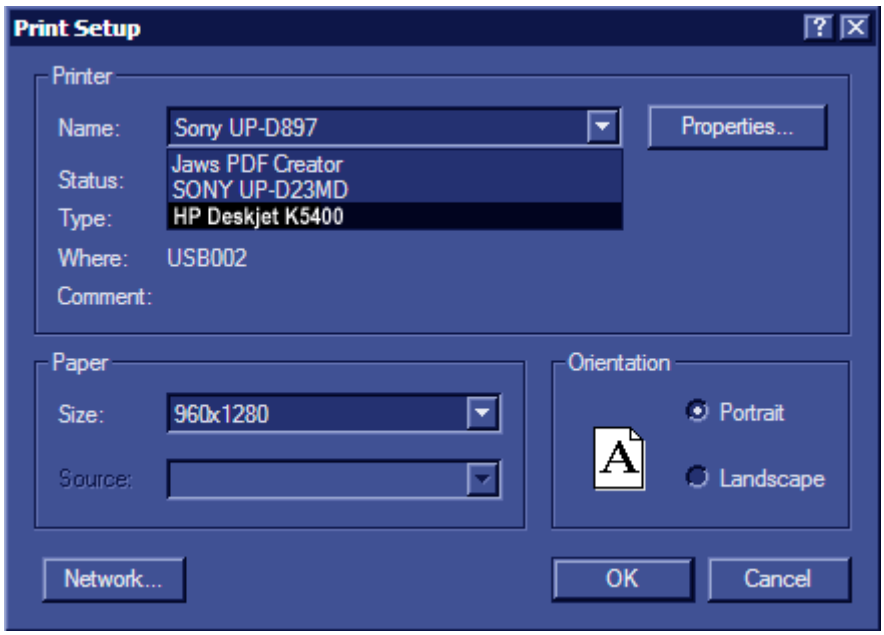


Figure 3-42 Printer Setup Screen

6.) From the drop-down menu, select **HP Deskjet K5400**.

7.) If necessary, select **Properties** to set the required printing parameters (e.g. *layout*, *printing density etc*.) then click **OK**.

The Printer Properties dialog re-opens (Figure 3-41 "Printer Properties Screen" on page 3-44).

8.) Select **OK**.

The HP Deskjet K5400 color printer is now configured as the Default Report Printer.

3-5-1-9 Setting Printing Orientation (Portrait or Landscape) and Paper Size

To change the printing orientation and printing paper size, configure the printer as described below.

To configure printers for portrait/landscape printing, the change must be performed at the Windows operating system level. The user first accesses the system at the Applications level from the Additional Outputs screen. By selecting the Advanced option under Selected Devices, the user accesses the Printer Properties dialog box and proceeds with the configuration procedure as explained below.

An additional procedure is required to configure the Sony UP-D897 Printer.
This is described in 3-5-1-10 "Configuring the Sony UP-D897 Printer" on page 3-49.

1.) On the system console, press **Config** and select **Connectivity**.

2.) From the **Additional Outputs** screen under **Selected Devices**, select **Advanced...**

Figure 3-43 Advanced option at Windows level

3-5-1-9 Setting Printing Orientation (Portrait or Landscape) and Paper Size (cont'd)

3.) Click **Configure** in the **Printer Properties** dialog to enter Print Setup.

Figure 3-44 Printer Properties Dialog Box

4.) In the Orientation area, select Portrait or Landscape as needed.

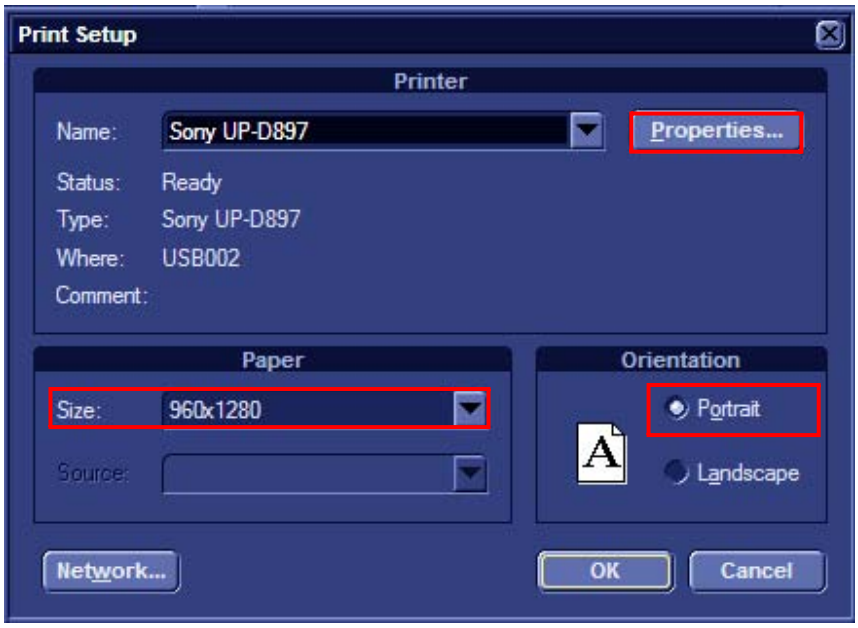


Figure 3-45 Printer Properties Dialog Box

5.) From the Paper Size dropdown list, select the required paper size.

3-5-1-9 Setting Printing Orientation (Portrait or Landscape) and Paper Size (cont'd)

6.) Click Properties. The printer properties screen opens - Figure 3-46.

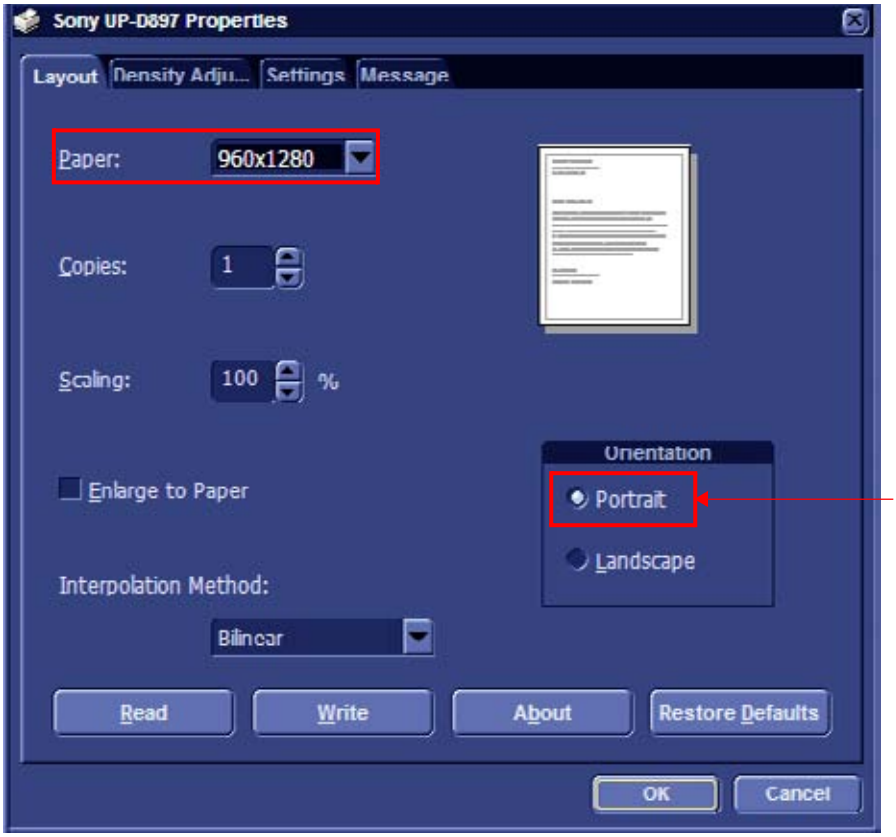


Figure 3-46 Printing Shortcut view verifying Portrait selection

7.) Verify that the selected orientation and paper size are correct.

8.) Click **OK** twice and then once more to return to the **Advanced Outputs** tab.

3-5-1-10 Configuring the Sony UP-D897 Printer

To configure the Sony UP-D897 Printer, the following steps are required:

1.) Click the Tcpip tab on the Connectivity screen (see Figure 3-43 on page 3-46).

2.) Select Advanced Settings (see Figure 3-47 on page 3-49).

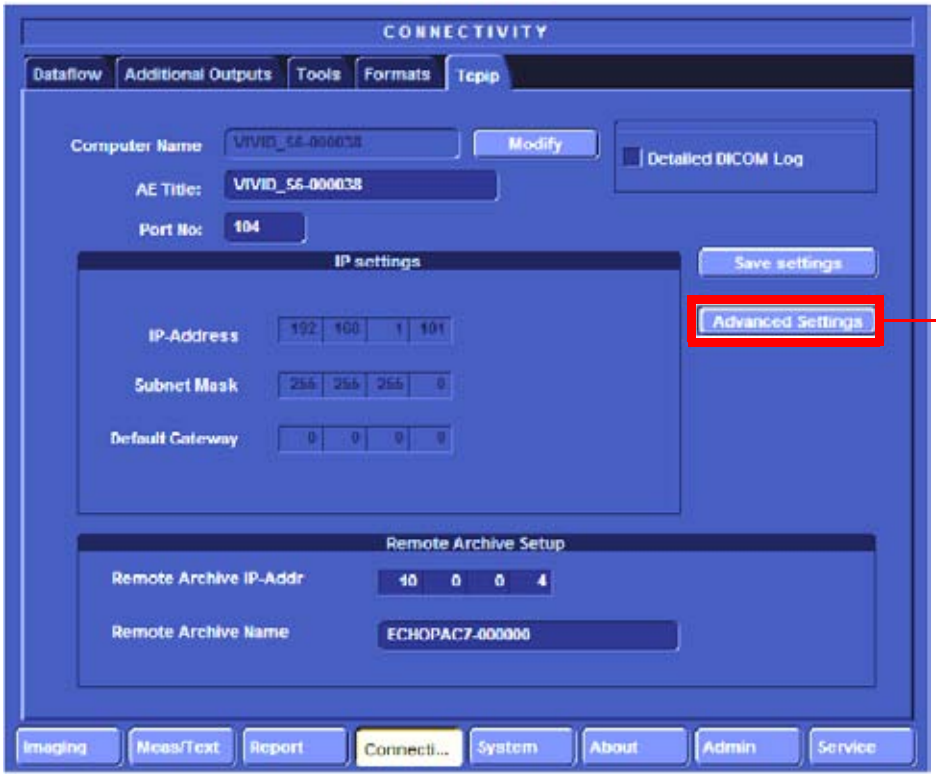


Figure 3-47 Tcpip screen

3.) The Network Connection screen opens, see: Figure 3-48. Click the "**Up**" button to open the Windows Control Panel.

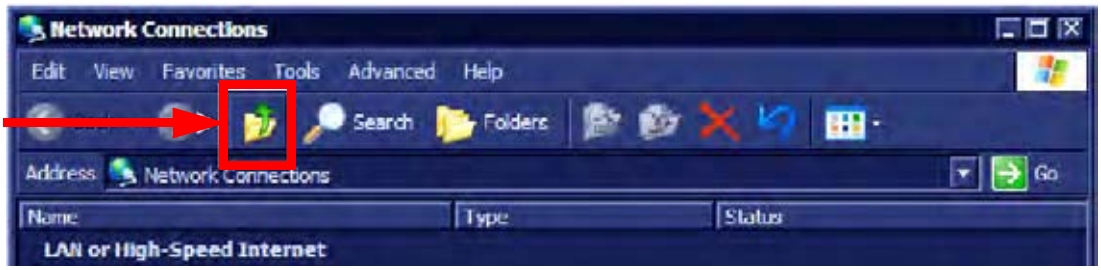


Figure 3-48 Network Connections showing highlighted "Up One Level" button

4.) Navigate to **Printers and Faxes** and double click **Sony UP-D897** to open the Sony UP-D897 Printer Configuration dialog.

5.) From the menu, select **Printer > Properties**.

3-5-1-10 Configuring the Sony UP-D897 Printer (cont'd)

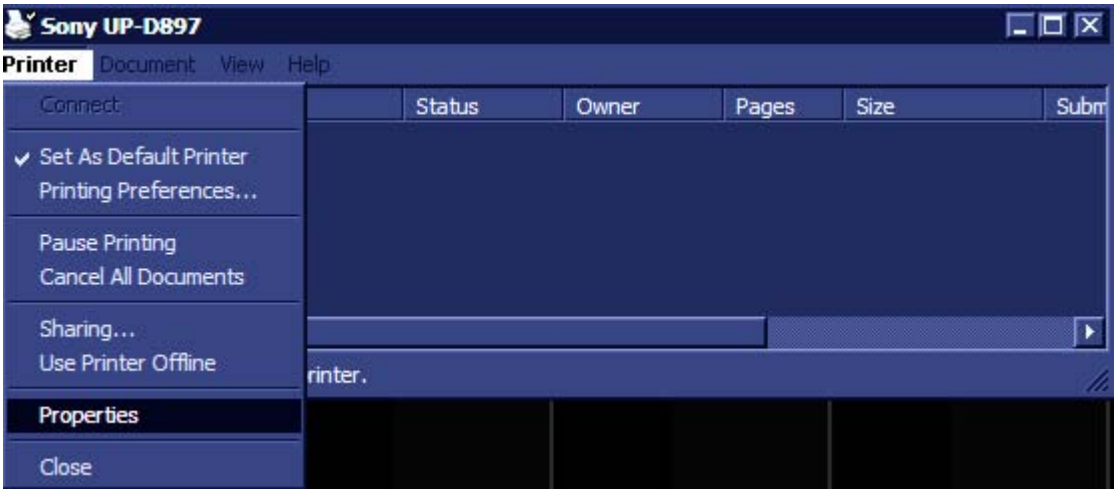


Figure 3-49 Sony UP-D897 printer configuration dialog box

6.) The Sony UP-D897 Properties screen opens. Select **Printing Preferences...**

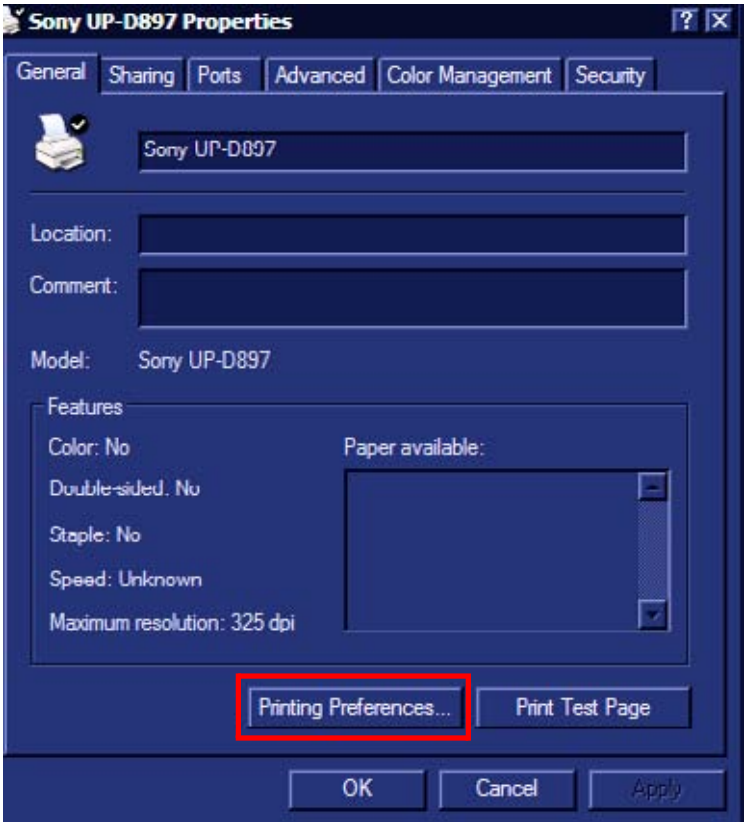


Figure 3-50 Sony UP-D897 Properties screen

7.) From the Printing Preferences dialog, under Orientation:

a.) Under Paper, click the scroll-down arrow and select the required paper size.

3-5-1-10 Configuring the Sony UP-D897 Printer (cont'd)

b.) Under **Orientation**, choose the required printing orientation.

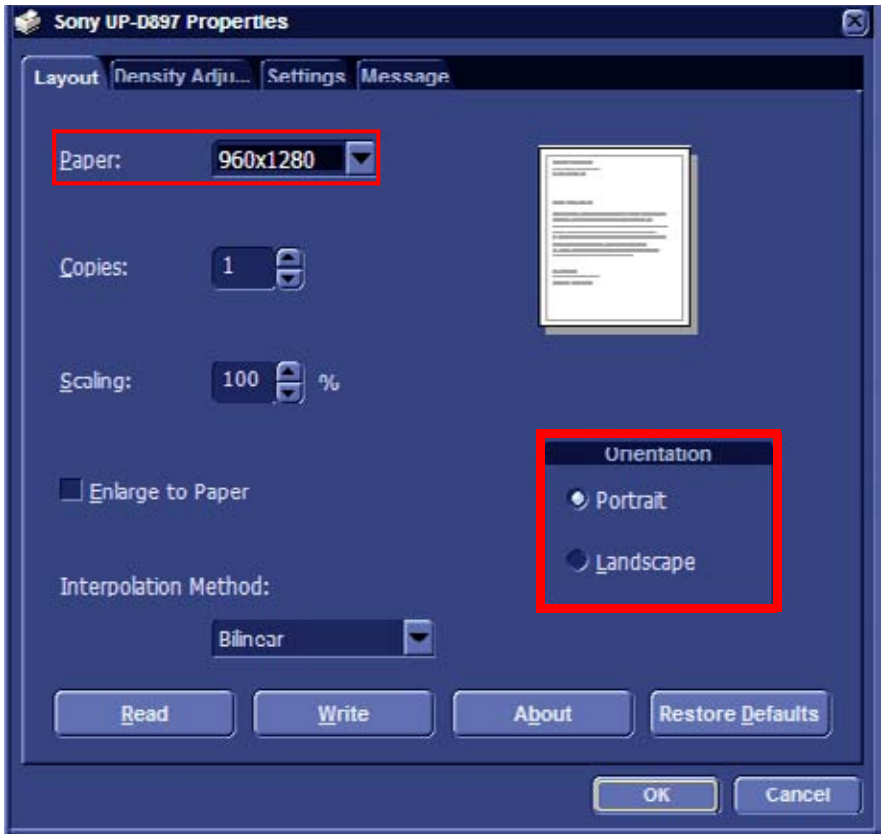


Figure 3-51 Printing Preferences screen

8.) Click **OK** and return to the Connectivity screen.

3-5-2 Connecting Probes

The Vivid S5 N or Vivid S6 N ultrasound unit operates with various types of probes that are used for scanning patients, including flat phased, convex and linear electronic array probes. Once connected, the probes can be selected for different applications.

Probe connectors on the unit are as follows:

- **Vivid S6 N system**: there are 5 active probe connectors (one for a pencil probe, three for RS probe types and one Logiq-type for TEE probes only) on the front of the unit.
- **Vivid S5 N system**: there are 4 active probe connectors (one for a pencil probe and three for RS probe types) on the front of the unit.

Probes can be connected or changed any time, as described below, regardless of whether the system is powered ON or OFF.

CAUTION **Handle the probe gently while connecting and disconnecting.**
Do NOT touch the patient and any of the connectors on the ultrasound unit simultaneously, including ultrasound probe connectors.

3-5-2 Connecting Probes (cont'd)

1) Place the probe's carrying case on a stable surface and open the case.
2) Inspect the probe socket to verify that it is free of debris.
3) Carefully remove the probe and unwrap the probe cord.

WARNING ***DO NOT allow the probe head to hang freely. Impact to the probe head could result in irreparable damage***

4) Press the probe connector locking lever to the *Left side* to open the RS probe port (Figure 3-52 "RS Probe Connection Locking Lever" on page 3-53).

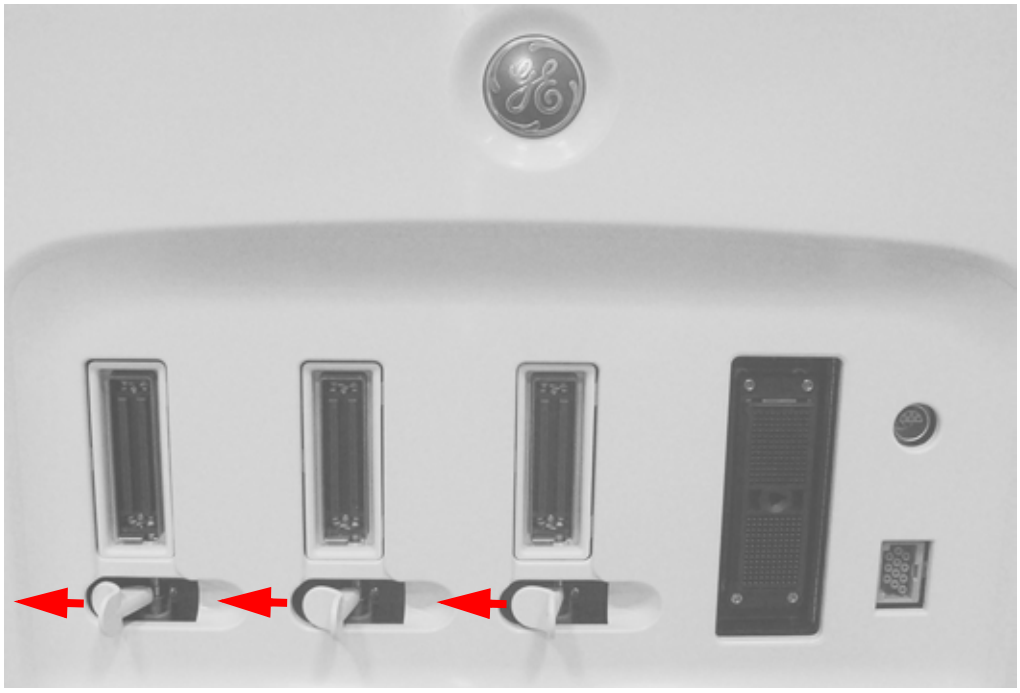


Figure 3-52 RS Probe Connection Locking Lever

5) Align the connector with the probe port and carefully push into place, as shown in Figure 3-53 "Connecting Probe to the Vivid S5 N or Vivid S6 N" on page 3-54.

3-5-2 Connecting Probes (cont'd)

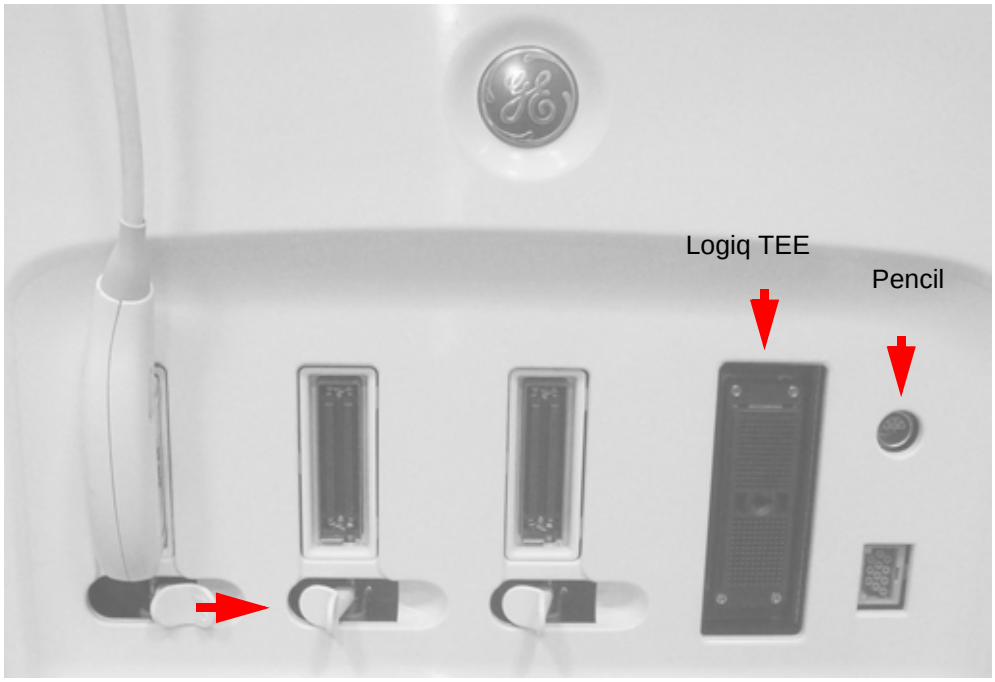


Figure 3-53 Connecting Probe to the Vivid S5 N or Vivid S6 N

6) Press the connector locking lever to the *right* to lock the probe in place, as shown in Figure 3-53 "Connecting Probe to the Vivid S5 N or Vivid S6 N" on page 3-54.

7) Carefully position the probe cord so that it is free to move and is not resting on the floor, placing the cable and probe head into one of the cable hooks or probe holders.

When the probe is connected, the user is required to select it (from the screen) in order to activate it. To activate the probe, press the **Probe** button and select the desired probe.

WARNING ***Do not bend the probe cable acutely.***
Fault conditions can result in electric shock hazard. Do not touch the surface of probe connectors which are exposed when the probe is removed. Do not touch the patient when connecting or disconnecting a probe

NOTE: It is not necessary to turn OFF power to connect or disconnect a probe.

NOTE: Logiq-type probes have their locking mechanism on the probe connector of each probe and should be used as instructed by the probe manufacturer.

NOTE: Pencil probes are pushed and locked into position. A release sleeve is located on the probe connector ; during removal, this needs to be pulled backwards to release the probe.

3-5-2-1 Available Probes

For a list of available probes, see: 9-3-7 "Probes" on page 9-16.

3-5-3 Connecting the ECG

NOTE: The ECG may be connected to the system at any time, whether the system is powered ON or OFF.

NOTICE Do not use the Vivid 7 ECG cable with the Vivid S5 N or Vivid S6 N system.

- To connect the internal ECG, carefully push the end of the cable connector into the ECG connector port (the green, rectangular-shaped socket located on the right side of the front of the system - beside the pencil probe connector), as shown in Figure 3-54 "Location of ECG Connector Port" on page 3-55.

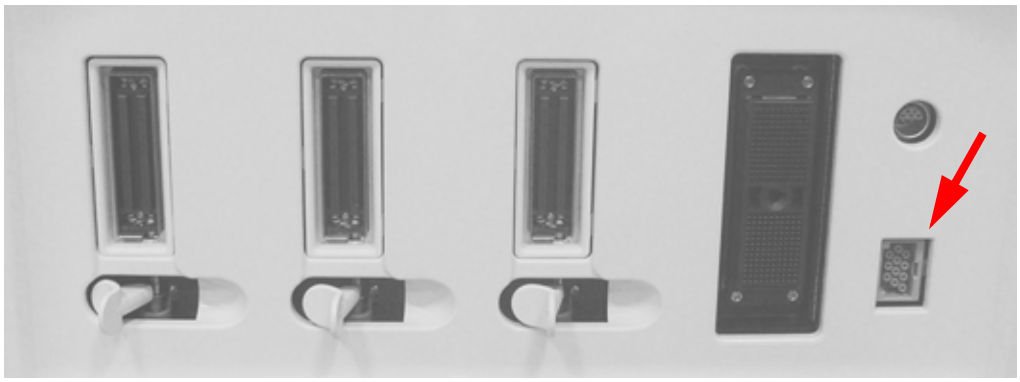


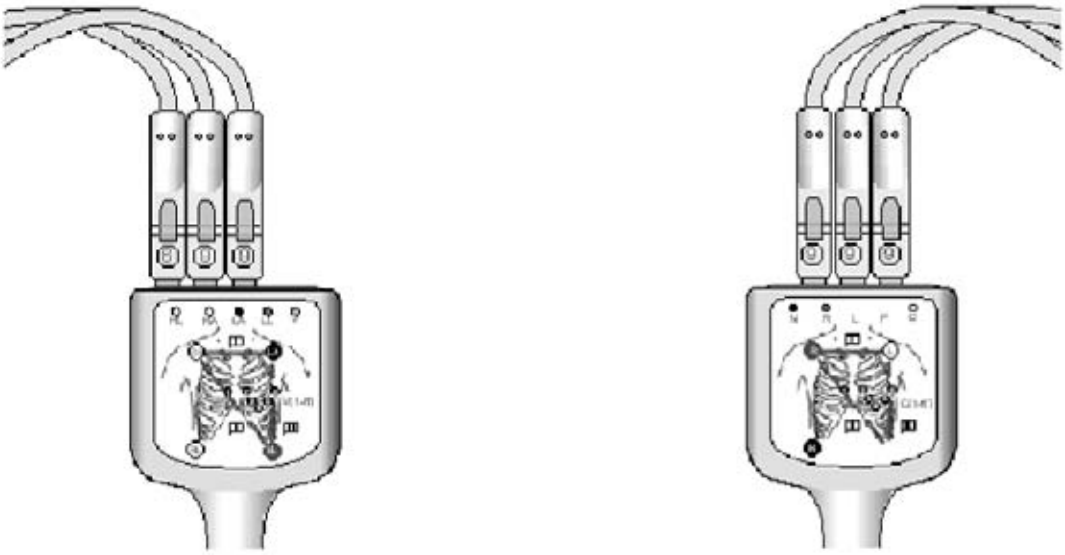
Figure 3-54 Location of ECG Connector Port

The same connector is used both for external and internal ECG. The appropriate ECG cable kit should be ordered when external ECG is to be used.

The ECG cable is a modular cable comprising four different cable parts. The main part (trunk) is a single cable connecting to the unit at one end, with a cable splitter device at the other end. The splitter has five receptacles, only three of which are used with the Vivid S5 N or Vivid S6 N ultrasound unit.

Three color-coded electrode cables are inserted into the splitter in the appropriate color-coded receptacles. Each electrode cable hooks up to the appropriate stick-on electrode by a clip-type connector. The color coding of the electrodes follows one of two standards that are common in different parts of the world. The cable splitter has a drawing defining the color codes, names and electrode placements for each of the three cables, as shown in Figure 3-55 "ECG Cable and Electrode Placement" on page 3-56.

3-5-3 Connecting the ECG (cont'd)



AHA (Americas, Japan) IEC (Europe, Asia, ROW)

Figure 3-55 ECG Cable and Electrode Placement

NOTE: For optimal ECG operation, use only electrodes that meet universal standards - see Table 3-8 "ECG Cable Types" on page 3-56.

Description		Part No.
Full ECG Cable Kit - AHA (Americas, Japan)		**2256477**
	Black wire (LA)	2269982-3
	White wire (RA)	2269982
	Green wire (RL)	2269982-2
Full ECG Cable Kit - IEC (Europe, Asia, ROW)		**2256478**
	Yellow wire (L)	2269983
	Red wire (R)	2269983-3
	Black wire (N)	2269983-2

Table 3-8 ECG Cable Types

3-5-4 Connecting the Unit to a Power Source

The connection of the ultrasound unit to a power source should be performed by a qualified person who has completed basic Vivid S5 N or Vivid S6 N System User Training. Use only the power cords, cables and plugs provided by or designated by GE HEALTHCARE to connect the unit to the power source.

CAUTION **Verify compliance with all electrical and safety requirements and check the power cord to verify that it is intact and of hospital-grade before connecting the unit to the power source. Products equipped with a power source (wall outlet) plug should be connected to the fixed power socket that has a protective grounding conductor. Never use an adapter or converter to connect with a power source plug (for example, a three-prong to two-prong converter)**

3-5-4-1 Voltage Level Checks

The following voltage level checks are required whenever the system is used:

1) Check the rating label at the rear of the scanner, as described in *Chapter 1* - Introduction, and verify that your local AC Voltage corresponds to the voltage setting as indicated on the rating label. The rating label indicates that the factory preset input AC voltage is one of the following:
   - 100 V - 120 V AC
   - 220 - 240 V AC
2) Verify the maximum power requirement as follows:
   - Maximum power = 500 VA (may be required by the system and peripherals)
   - 100 - 120 V AC, 50-60 Hz 500VA
   - 220 - 240 V AC, 50-60 Hz 500VA

DANGER **Failure to provide an adequate earth circuit (Ground) may cause electrical shock and serious injury!**

3-5-4-2 Connecting the Ultrasound Unit to the Electrical Outlet

DANGER **To avoid the risk of fire, power to the system must be supplied from a properly rated outlet. It is recommended to use a dedicated power outlet. The power plug should not, under any circumstances, be altered to a configuration rated less than that specified for the current.**
DO NOT use an extension cord or adaptor plug. Refer to the *Electrical Requirements* section, on page 2-3 for more details.

DANGER **ALWAYS CONNECT THE UNIT TO A FIXED POWER SOCKET WHICH HAS THE PROTECTIVE GROUNDING CONNECTOR.**

DANGER **NEVER USE A THREE-TO-TWO PRONG ADAPTER; THIS DEFEATS THE SAFETY GROUND.**

3-5-4 Connecting the Unit to a Power Source (cont'd)

DANGER **ENSURE THAT THE POWER CORD AND PLUG ARE INTACT AND THAT THE POWER PLUG IS THE PROPER HOSPITAL-GRADE TYPE (WHERE REQUIRED)**

NOTICE Use only power supply cords, cables and plugs provided by or designated by GE HEALTHCARE.

CAUTION **The system requires all covers.**
Operate this unit only when all board covers and frame panels are securely in place. The covers are required for safe operation, good system performance and cooling purposes.

NOTE: Connecting electrical power to the Vivid S5 N or Vivid S6 N ultrasound unit involves preliminary checks of the power cord, voltage level and compliance with electrical safety requirements.

1) Ensure that the wall outlet is of appropriate type, and that the power circuit breaker is turned OFF.
2) Uncoil the power cable, allowing sufficient slack so that the unit can be moved slightly.
3) Verify that the power cable is without any visible scratches or any sign of damage.
4) Verify that the on-site mains voltage is within the limits indicated on the rating label on the Vivid S5 N or Vivid S6 N ultrasound scanner.
5.) Connect the Mains Power Cable female plug to the Power Inlet (AC IN - refer to Figure 3-56 "Mains Power Connector - Rear Panel" on page 3-58) at the rear of the unit. Use the cable clip to secure the cable firmly in the socket.

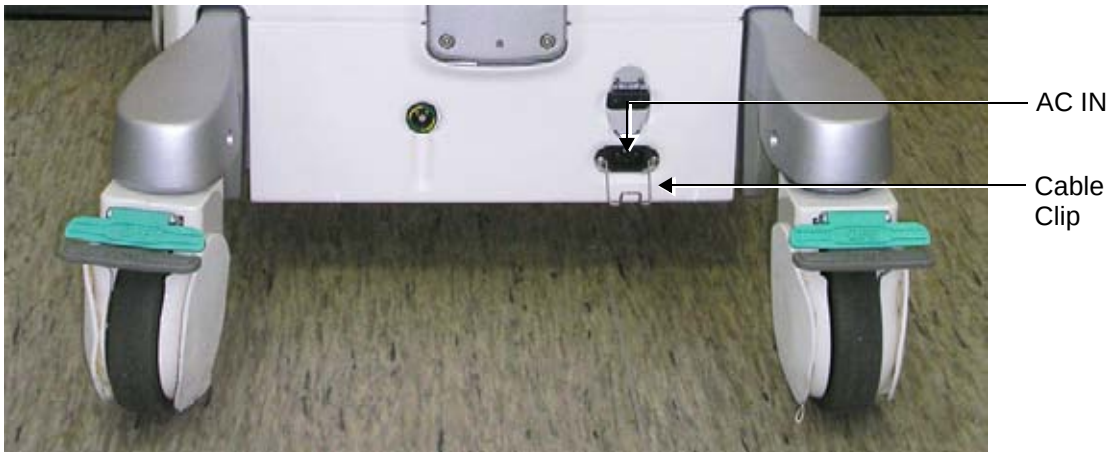


Figure 3-56 Mains Power Connector - Rear Panel

NOTE: In the next step, it is necessary to screw the plastic cable clamp (into the hole provided in the support column - centrally located at the rear of the system, see Figure 3-57 "Plastic Cable Clamp and Securing Screw" on page 3-59).
Then, to route the Mains Power cable upwards and through the clamp, and secure the clamp in position to prevent the cable from dangling down and becoming caught in the wheels when moving the scanner (see Figure 3-58 "Mains Power Cable Secured with Plastic Cable Clamp" on page 3-59).

3-5-4 Connecting the Unit to a Power Source (cont'd)

Figure 3-57 Plastic Cable Clamp and Securing Screw

6.) Proceed as follows:

a.) Loosen the screw to open the plastic cable clamp.

b.) Route the cable *upwards* and through the clamp.

c.) Screw the clamp into position on the support column, carefully tightening the screw sufficiently to secure the cable firmly in the clamp.
Take care not to overtighten the screw, or damage the cable!

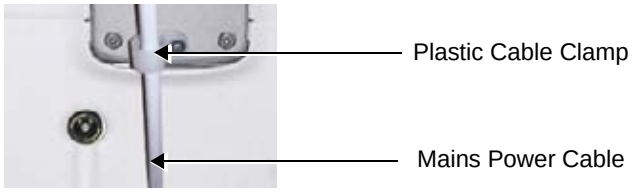


Figure 3-58 Mains Power Cable Secured with Plastic Cable Clamp

7.) Connect the other end (male plug) of the Mains Power Cable to a hospital-grade mains power outlet with the proper rated voltage.

8.) Turn ON the circuit breaker at the rear of the system.

The unit is now ready for Power ON/Boot Up. Refer to the instructions for "Turning the System ON" on page 5.

3-5-4-3 Disconnecting the Ultrasound Unit from the Electrical Outlet

CAUTION **Whenever disconnecting the Vivid S5 N or Vivid S6 N unit from the electrical outlet, always observe the safety precautions. First unplug the mains power cable from the wall outlet socket, then from the unit itself. Remove by pulling on the cable connector - DO NOT pull on the cable.**

1) Turn OFF the scanner.

2) Turn OFF the circuit breaker at the rear of the system.

3) Unplug the mains power cable from the AC wall outlet socket.

4) Unplug the mains power cable connector from the AC input socket at the bottom rear of the scanner.

3-5-5 Switching the System ON/OFF

3-5-5-1 Switching the System ON

1) Verify that the ultrasound unit has been connected to the mains power and that the circuit breaker is ON, as described in 3-5-4-2 "Connecting the Ultrasound Unit to the Electrical Outlet" on page 3-57.

NOTICE When AC power is applied to the scanner, the **On/Off** button on the control console illuminates amber, indicating the Back-end Processor is in *ready* mode.

2) Hold down the **On/Off** button on the control panel for 3 seconds. The system automatically performs an initialization sequence which includes the following:
   - Loading the operating system.
   - Running a quick diagnostic check of the system.
   - Detecting connected probes.
3) When prompted, log in to the system as appropriate.
   (Refer to the instructions for system login and user security setup as described in the Vivid S5 N or Vivid S6 N User Manual).

The system first enters 2D-Mode with the probe and application that were last used before the system was shut down. If the probe has been removed since the system was last used, the currently-connected probes and their available applications are displayed and selected by default.

3-5-5-2 Switching the System OFF

NOTE: After turning OFF the system, wait at least 10 seconds before turning it on again. The system may not be able to boot-up if power is recycled too quickly.

The system can be switched OFF in one of three ways, as follows:

- Pressing the **On/Off** button will evoke the display of the System Exit dialog box (see Figure 3-59 "System Exit Dialog Box" on page 3-60). From this, you can either select *Full Shutdown* (click the **Shutdown** button) or choose to place the system in *Standby Mode* (click the **Standby** button).

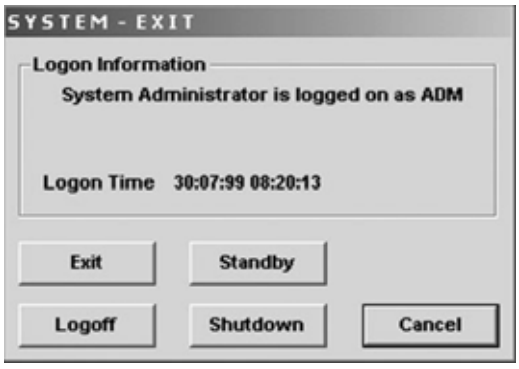


Figure 3-59 System Exit Dialog Box

- Holding down the **On/Off** button for more than 10 secs will cause the system to perform *Emergency Shutdown.* This is not recommended under normal circumstances.

NOTE: The system will remain in Standby Mode for as long as battery power will allow.

Section 3-6
Configuration

3-6-1 Overview

Table 3-9 "Configuration Procedures" on page 3-61 outlines the Vivid S5 N or Vivid S6 N Configuration procedures described in the relevant sub-sections.

Table 3-9 Configuration Procedures

Sub-section	Description	Page Number
3-6-2	Vivid S5 N and Vivid S6 N Configuration	3-61
3-6-2-1	Enter Location	3-62
3-6-2-2	Date and Time Adjustments	3-63
3-6-2-3	Language Selection	3-64
3-6-2-4	Units of Measure	3-65
3-6-3	Service Screen Set-up	3-66
3-6-4	Configuring Peripherals	3-73
3-6-4-1	Approved Peripherals	3-73
3-6-4-2	Network Peripherals (Optional)	3-73
3-6-5	Software Options Configuration	3-76

3-6-2 Vivid S5 N and Vivid S6 N Configuration

3-6-2-1 Enter Location

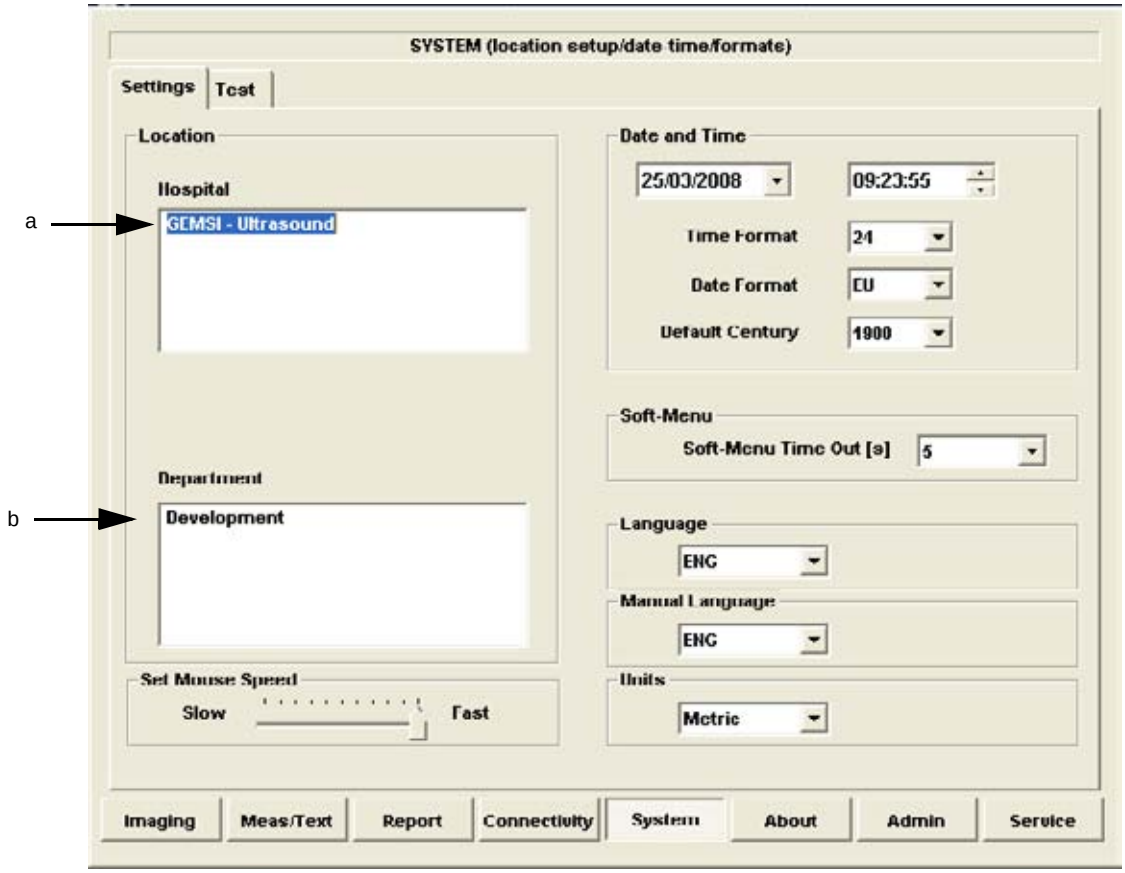


Figure 3-60 Hospital and Department Name

Table 3-10 Location Name

Step	Task	Expected Result(s)
1.	Open the Configuration Window, see 1. . If needed, select SYSTEM. Select the SETTINGS tab.	*The System Settings Window is displayed.*
2.	Select the Hospital field, see (a) in Figure 3-60 "Hospital and Department Name" on page 3-62, and type the name of the hospital (max 64 characters).	The 24 first characters of this name are displayed on the scanning screen's title bar (after restart) All 64 characters are displayed on the image properties on saved images (after restart).
3.	Select the Department field, see (b) in Figure 3-60 "Hospital and Department Name" on page 3-62, and type the name of the department (max 64 characters).	This name will be displayed on the image properties on saved images as soon as the unit has been restarted.

3-6-2 Vivid S5 N and Vivid S6 N Configuration (cont'd)

3-6-2-2 Date and Time Adjustments

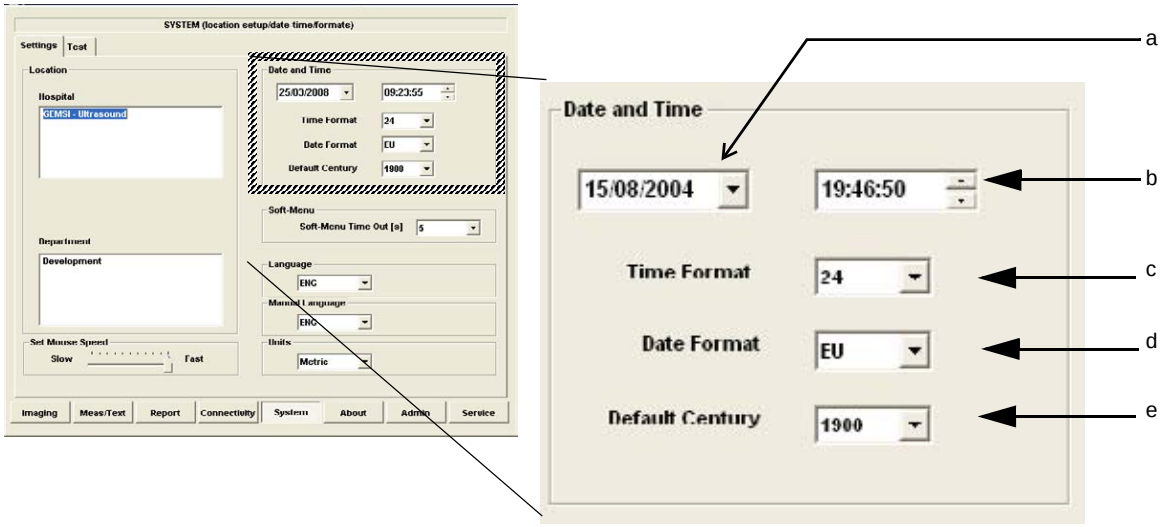


Figure 3-61 Date and Time Adjustments

Table 3-11 Date and Time Adjustments

Step	Task	Expected Result(s)
1.	Open the System (Configuration) Window, see Figure 3-60 "Hospital and Department Name" on page 3-62. Select **SYSTEM**, if needed. Select the SETTINGS tab.	*The System Settings Window is displayed.*
2.	Adjust the date, see (a) in Figure 3-61 "Date and Time Adjustments" on page 3-63.	New date is displayed
3.	Adjust the time, see (b) in Figure 3-61 "Date and Time Adjustments" on page 3-63.	New time is displayed
4.	Select the preferred Time Format, see (c) in Figure 3-61 "Date and Time Adjustments" on page 3-63.	**24:** the 24 hour format is used **12**: the 12 AM/PM hour format is used
5.	Select the preferred Date Format, see (d) in Figure 3-61 "Date and Time Adjustments" on page 3-63. DD = Date (two digits) MM = Month (two digits) YYYY = Year (four digits)	**EU:** the European "DD.MM.YYYY" format is used **US:** the American "MM.DD.YYYY" format is used
6.	Select Default Century (1900, 2000 or None), see (e) in Figure 3-61 "Date and Time Adjustments" on page 3-63.	**1900:** the number **19** is automatically displayed when entering the year in the patient date of birth. To edit century, press **BACKSPACE** twice. **2000:** the number **20** is automatically displayed when entering the year in the patient date of birth. To edit century, press **BACKSPACE** twice. **None:** the four digits have to be typed when entering the year in the patient date of birth. The selected setting will be used as soon as the unit has been restarted.

3-6-2 Vivid S5 N and Vivid S6 N Configuration (cont'd)

3-6-2-3 Language Selection

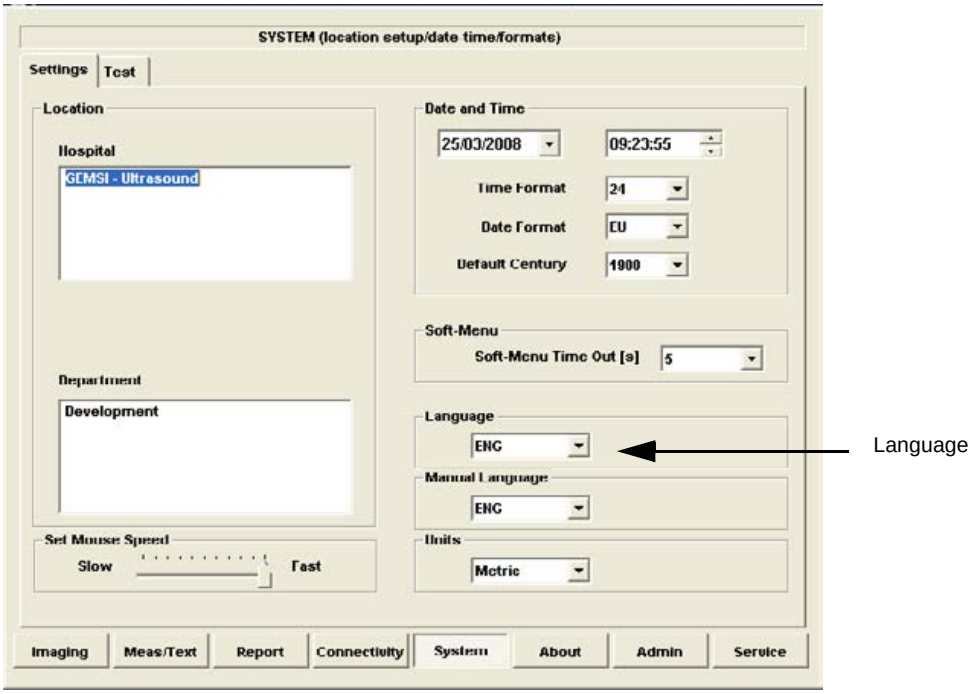


Figure 3-62 Language Selection

Table 3-12 Language Adjustments

STEP	TASK	EXPECTED RESULT(S)
1.	Open the Configuration Window, see "Log On to the System as ADM" on page 10. Select **SYSTEM**, if needed. Select the SETTINGS tab.	*The System Settings Window is displayed.*
2.	Use the Language drop down dialog, see Figure 3-62 "Language Selection" on page 3-64, to select your preferred language for the on-screen interface. The following languages are available; - ENG - English - FRA - French - TUR - Turkish	The selected language will be used as soon as the unit has been restarted.

3-6-2 Vivid S5 N and Vivid S6 N Configuration (cont'd)

3-6-2-4 Units of Measure

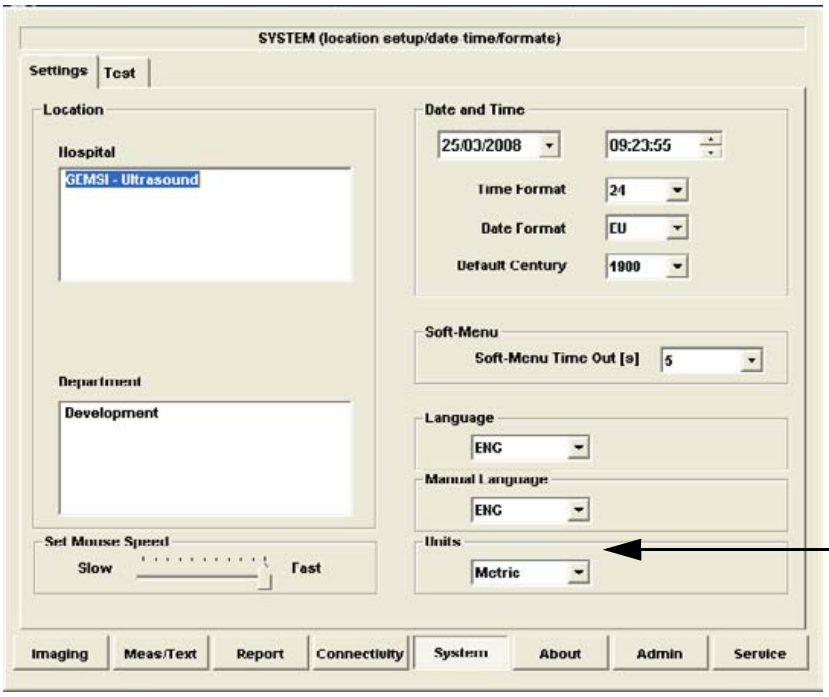


Figure 3-63 Select Units of Measure

Table 3-13 Select Units of Measure

STEP	TASK	EXPECTED RESULT(S)
1.	Open the Configuration Window, see "Log On to the System as ADM" on page 10. Select SYSTEM, if needed. Select the SETTINGS tab.	*The System Settings Window is displayed.*
2.	Use the drop down Units dialog (see Figure 3-63 "Select Units of Measure" on page 3-65) to select Metric or US Units.	The selected units (Metric or US) will be used for measurements as soon as the unit has been restarted.
3.	Restart the scanner.	All the changed settings will be used after the restart.

3-6-3 Service Screen Set-up

3-6-3-1 Overview

The Service Screen gives you access to:

- Keyboard Setups
- Printer Setup
- Disable TCPIP filtering

3-6-3-2 Open Service Screen

1.) Press **CONFIG** (**F2**) and log on as Adm, see “Log On to the System as ADM” on page 10.

2.) Select SERVICE to view the Service Screen, see Figure 3-64 "Service Screen (Example)" on page 3-66.

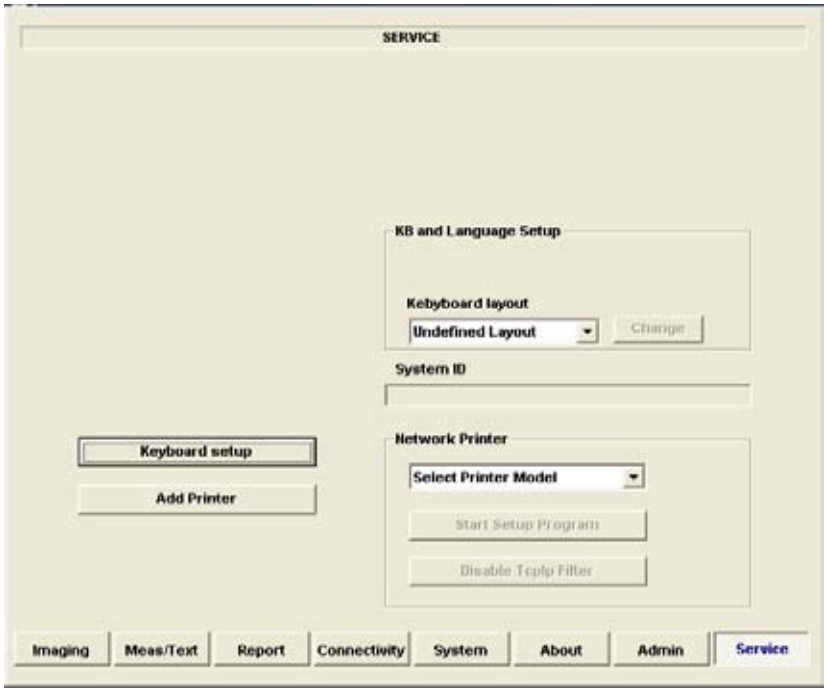


Figure 3-64 Service Screen (Example)

3-6-3 Service Screen Set-up (cont'd)

3-6-3-3 Adjust Keyboard Backlight Intensity

- Press <**ALT**> + **L**.
- Use the sliders in the *Front Panel Lights Setup* dialog box to adjust **Backlight Intensity** of the Encoder Lights, Slider Lights, Alphanumeric keyboard, Extended ultrasound keyboard back lights, and/or Active keys, as required.

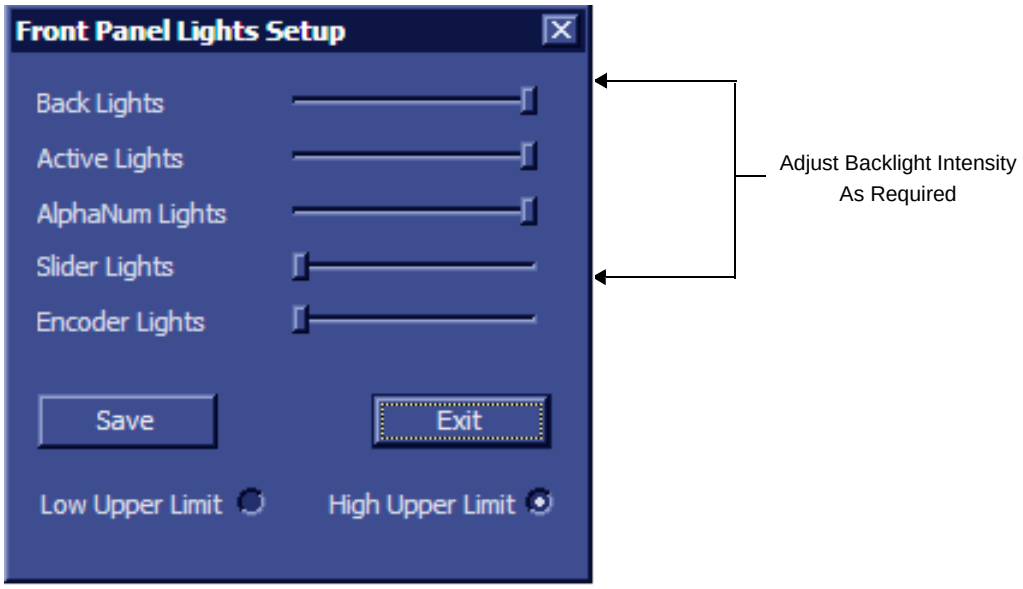


Figure 3-65 Keyboard Light Intensity Adjustment

3-6-3-4 LCD Display Adjustment and Calibration

Adjustments may be made to the LCD Display, to control and calibrate the Contrast, Brightness, and/or Blue Tint settings, as required.
Pressing the <F4> or <LCD> will prompt display of the softkey menu allowing the user to adjust the LCD parameters. On Vivid S6 N systems, the user may adjust the LCD to the ambient light by using the two light sensors located on the left and right sides of the keyboard.

Figure 3-66 LCD Adjustments on Vivid S6 N Systems

Figure 3-67 LCD Adjustments on Vivid S5 N Systems

For instructions, see 6-1-2 "LCD Display Adjustments and Calibration" on page 6-1.

3-6-3 Service Screen Set-up (cont'd)

3-6-3-5 Keyboard Setup

1) Press <F2>, select Service Tab.

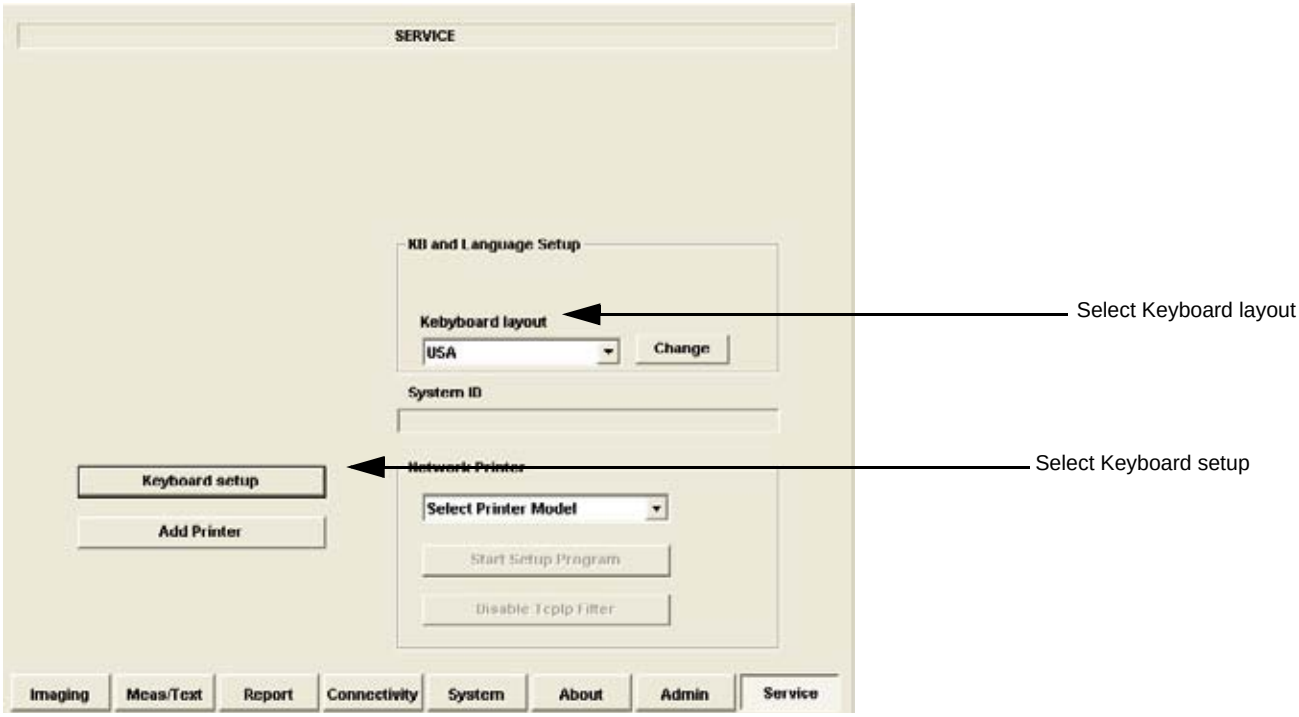


Figure 3-68 Select Keyboard Setup

2) From the **Keyboard layout** dropdown list, select the desired layout and click CHANGE.

3) Click KEYBOARD SETUP.

   Verify that the selected language and location are correct. If they are not correct, modify as required.

3-6-3 Service Screen Set-up (cont'd)

3-6-3-5-1 Regional Options

- Select appropriate Format and Location, then click **Apply.**

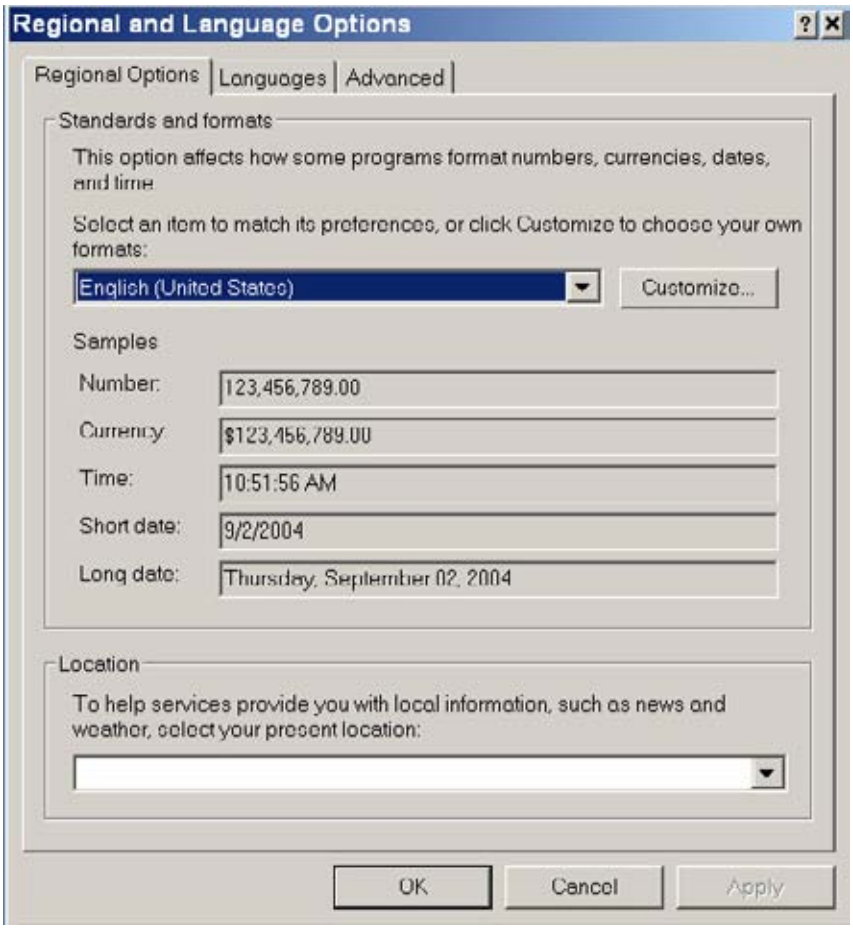


Figure 3-69 Regional Options

3-6-3 Service Screen Set-up (cont'd)

3-6-3-5-2 Languages

1.) Under the Languages tab, click **Details** to select appropriate Language.

2.) If necessary, activate applicable Supplemental Language Support check box, then click **Apply.**

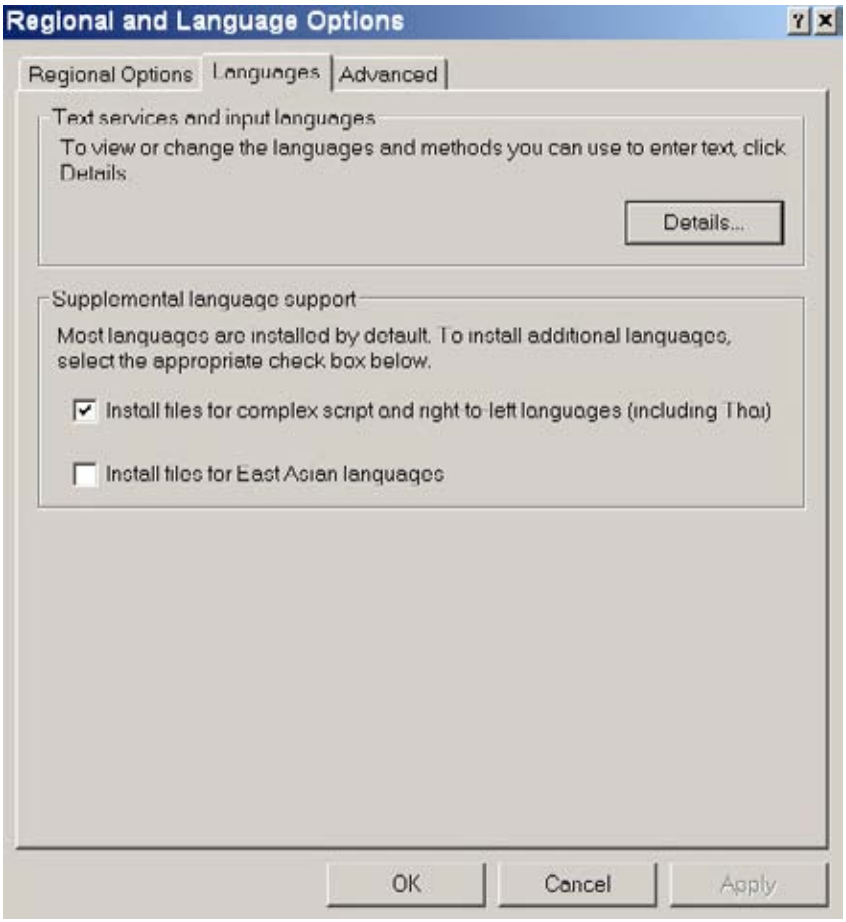

Regional and Language Options
Regional Options
Languages
Advanced
Text services and input languages
To view or change the languages and methods you can use to enter text, click Details
Details...
Supplemental language support
Most languages are installed by default. To install additional languages, select the appropriate check box below.
Install files for complex script and right-to-left languages (including Thai)
Install files for East Asian languages
OK
Cancel
Apply

Figure 3-70 Languages

3-6-3 Service Screen Set-up (cont'd)

3-6-3-5-3 Advanced

1.) Under the Advanced tab, select a language version of the non-unicode programs you want to use, then click open square beside **Apply**.

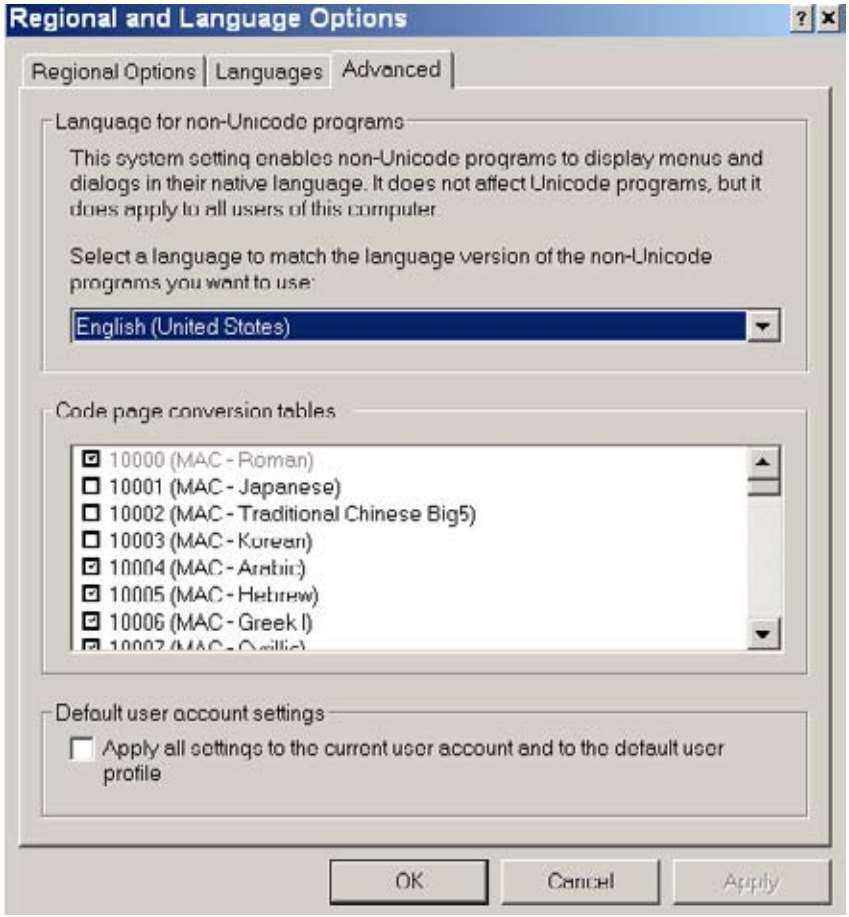

Regional and Language Options
Regional Options
Languages
Advanced
Language for non-Unicode programs
This system setting enables non-Unicode programs to display menus and dialogs in their native language. It does not affect Unicode programs, but it does apply to all users of this computer.
Select a language to match the language version of the non-Unicode programs you want to use:
English (United States)
Code page conversion tables
10000 (MAC - Roman)
10001 (MAC - Japanese)
10002 (MAC - Traditional Chinese Big5)
10003 (MAC - Korean)
10004 (MAC - Arabic)
10005 (MAC - Hebrew)
10006 (MAC - Greek I)
Default user account settings
Apply all settings to the current user account and to the default user profile
OK
Cancel
Apply

Figure 3-71 Advanced

2.) Click OK.

3-6-3 Service Screen Set-up (cont'd)

3-6-3-6 Add Printer

NOTE: This option should not be used by un-authorized personnel. This option will prompt you to the Windows Installation Wizard. Normally, all software drivers are pre-installed and there is no need to use this functionality. In special cases where there is a need, follow the instructions provided by GE HEALTHCARE or the instructions in the respective printer installation manual.

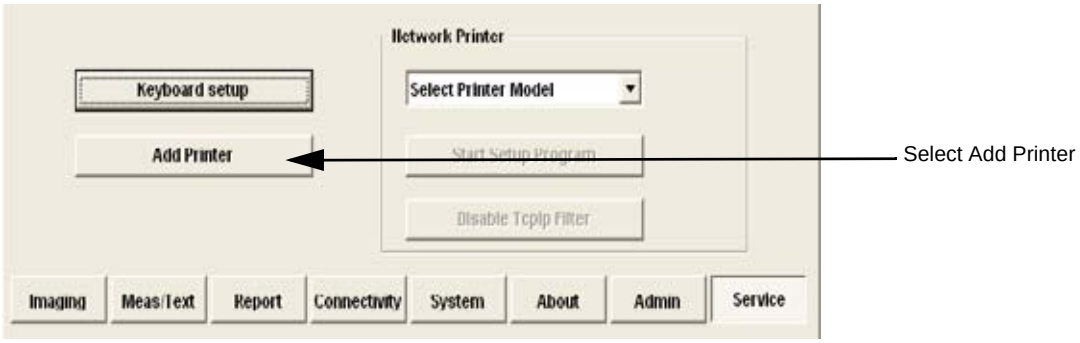


Figure 3-72 Select Add Printer

1.) Select ADD PRINTER to start the Add Printer (Installation) Wizard.

Add Printer Wizard
Welcome to the Add Printer Wizard
This wizard helps you install a printer or make printer connections.
If you have a Plug and Play printer that connects through a USB port (or any other hot pluggable port, such as IEEE 1394, infrared, and so on), you do not need to use this wizard. Click Cancel to close the wizard, and then plug the printer's cable into your computer or point the printer toward your computer's infrared port, and turn the printer on. Windows will automatically install the printer for you.
To continue, click Next.
< Back
Next >
Cancel

Figure 3-73 Add Printer Wizard

2.) Follow the instructions in the Wizard to install a new printer.

3-6-4 Configuring Peripherals

3-6-4-1 Approved Peripherals

The following lists the internal peripherals available for use with the Vivid S5 N or Vivid S6 N scanner and details their method of connection:

- Printer - Black & White, digital, Sony (via USB).
- Printer - Color, digital, Sony (via USB).
- MO Drive (via USB).
- Built-in DVD\CD-R Drive (via USB).
- Printer - Deskjet, HP-460 (via USB or Bluetooth, optional).
- Wireless LAN (via USB)
- Virtual printer (any of the DeskJet printers can be used as virtual printers when the user is in a remote location).

3-6-4-2 Network Peripherals (Optional)

The printers detailed below are connected via Ethernet (TCP/IP Network).

The system will support a network printer that will be released in the future.

3-6-4 Configuring Peripherals (cont'd)

3-6-4-3 Virtual Printing (Optional)

Virtual printing is not configurable. The functionality of virtual printing provides the ability to print to a specific printer, even though it is not physically connected.

Once the printer has been re-connected again, all the spooled print jobs will be printed out automatically.

Sometimes this feature is device dependent. Therefore, in order to initiate the manual "print of all spooled jobs" process, proceed as described below.

1.) Press <**ALT**> + **P**.

The Printers and Faxes window is displayed.

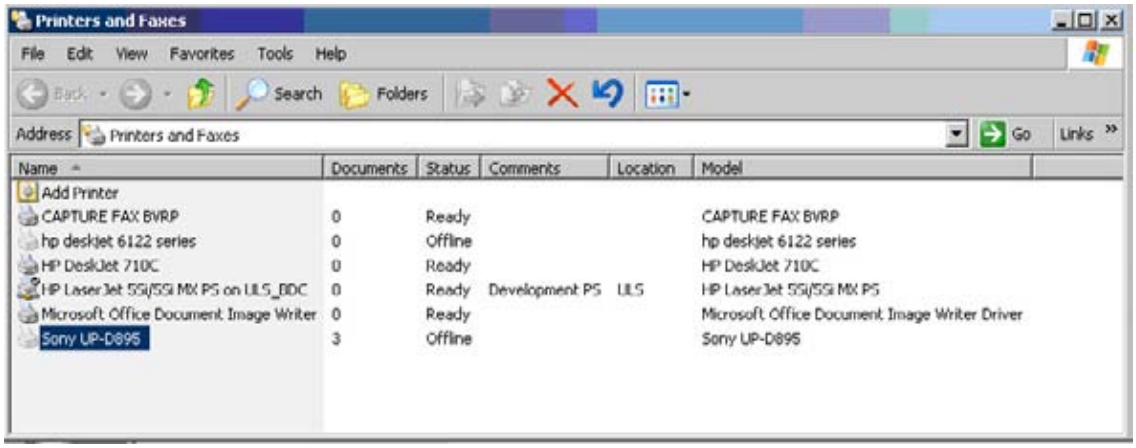

Printers and Faxes
File Edit View Favorites Tools Help
Search Folders
Address Printers and Faxes
Go Links
Name Documents Status Comments Location Model
Add Printer
CAPTURE FAX BVRP 0 Ready CAPTURE FAX BVRP
hp deskjet 6122 series 0 Offline hp deskjet 6122 series
HP DeskJet 710C 0 Ready HP DeskJet 710C
HP LaserJet 5Si/5Si MX PS on ULS_DDC 0 Ready Development PS ULS HP LaserJet 5Si/5Si MX PS
Microsoft Office Document Image Writer 0 Ready Microsoft Office Document Image Writer Driver
Sony UP-D895 3 Offline Sony UP-D895

Figure 3-74 Printers and Faxes Window

2) Right-click on the destination virtual printer (see Figure 3-74) and select **Open**.

The Virtual Printer Job Queue window is displayed.

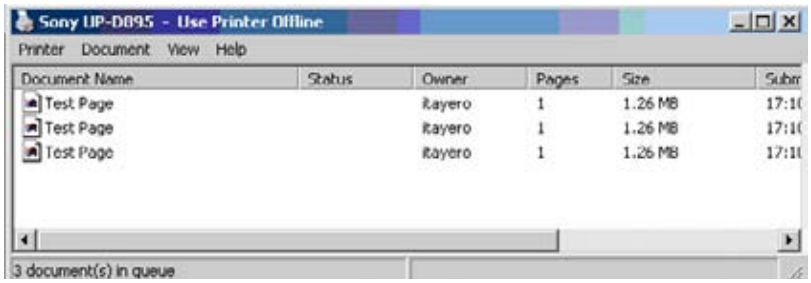

Sony UP-D895 - Use Printer Offline
Printer Document View Help
Document Name Status Owner Pages Size
Test Page Rayero 1 1.26 MB
Test Page Rayero 1 1.26 MB
Test Page Rayero 1 1.26 MB
3 document(s) in queue

Figure 3-75 Virtual Printer Job Queue Window

3-6-4 Configuring Peripherals (cont'd)

3.) From the queued Print Jobs, right-click and select **Cancel** to clear any spooled jobs not required.

Figure 3-76 Resuming Spooled Print Job

4.) Right-click and select **Restart** to resume print job/s for printing, as required

3-6-5 Software Options Configuration

3-6-5-1 Software Option Installation

A Password (Software Option String) enables a software option or a combination of software options. This password is specific for each Vivid S5 N and Vivid S6 N.

3-6-5-2 On-site Configuration

1.) Press **CONFIG** (**F2**) and log on as *Adm* - see “Log On to the System as ADM” on page 10.
2.) Select ADMIN (lower part of window),
3.) Select the SYSTEM ADMIN tab.

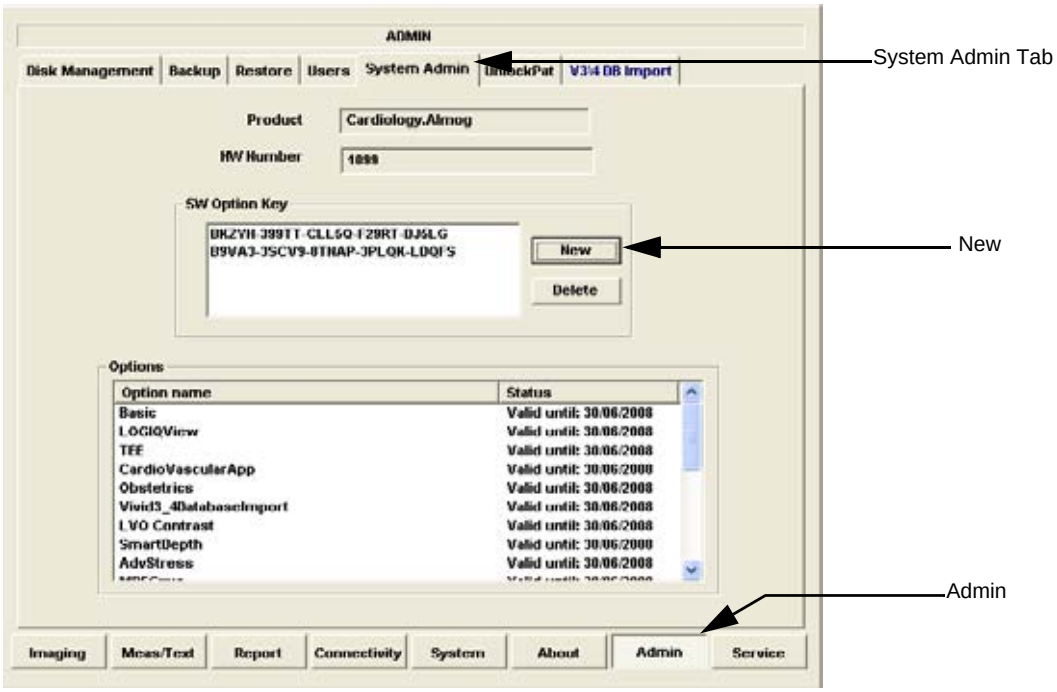


Figure 3-77 System Admin screen

4.) Select NEW to open the New Key dialog where you type the Software Option Key (Serial String).

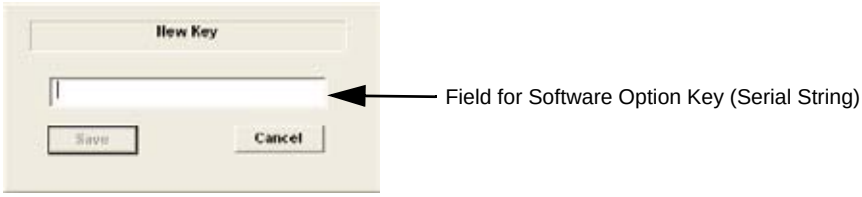


Figure 3-78 Type Software Option Key

CAUTION If password is incorrect, please contact your local GE Service representative.

5.) Type the Password (Software Option Key).
6.) Press OK to save the new setting.
7.) Close the Config window.
8.) Restart the scanner after each entry of a new software option.

3-6-5 Software Options Configuration (cont'd)

3-6-5-3 Remote Check and Configuration

Contact the OnLine Center for InSite Checkout.

Section 3-7
Connectivity Setup

3-7-1 Connectivity Introduction

The Vivid S5 N or Vivid S6 N ultrasound unit can be connected to various connectivity devices, such as DICOM devices and EchoPac servers. The following sections describe how to connect the system to a remote archive/work station or a DICOM service, using a TCP/IP connection.

This section describes communication and connection options between the Vivid S5 N or Vivid S6 N ultrasound unit and other devices in the hospital information system.

The following scenarios are covered:

- A stand-alone Vivid S5 N or Vivid S6 N scanner.
- A Vivid S5 N or Vivid S6 N and one or several EchoPAC PC workstations in a “Sneaker Net” environment. (“Sneaker Net” means that you use an MO Disk to move data because no network is available).
- A Vivid S5 N or Vivid S6 N and an EchoPAC PC workstation in a direct connect environment.
- A Vivid S5 N or Vivid S6 N and a DICOM server in a network.
- A Vivid S5 N or Vivid S6 N scanner configured for MPEGVue export to removable media: CD, DVD, or USB Memory stick. (Data can later be viewed on any remote PC).
- A Vivid S5 N or Vivid S6 N workstation connected to the Hospital Information System (HIS), via the Vivid HL7 Gateway.
- A Vivid S5 N or Vivid S6 N scanner configured for eVue.
  Images or loops may be transmitted to a designated PC (“e-Vue PC”) on the network (in compact MPEG format), and will appear at the review PC in almost real time.
- Worklist as a source for additional patients from the network.

NOTE: *Compatibility: Vivid S5 N and Vivid S6 N scanners have been confirmed to be compatible with Vivid 7 and EchoPac (BT08 versions), and Image Vault version 4.3.*

3-7-1-1 The Dataflow Concept

Communication between the Vivid S5 N or Vivid S6 N ultrasound unit and other information providers on the network takes the form of dataflows. Each dataflow defines the transfer of patient information from either an input source to the unit, or from the unit to an output source (see examples in Figure 3-79 "Examples of Dataflows" on page 3-79).

Patient information can include demographic data and images, as well as reports and Measurement and Analysis (M&A) data.

A dataflow is a set of pre-configured services. Selecting a dataflow will automatically customize the ultrasound unit to work according to the services associated with this dataflow.

By utilizing dataflows, the user can configure the Vivid S5 N or Vivid S6 N ultrasound unit to optimally meet the needs of the facility, while keeping the user interface unchanged. Once the dataflow is selected, the actual location of the database is entirely transparent.

3-7-1-2 Dataflow Naming Convention

The predefined dataflows have descriptive names.

Example: *LocalArchive-Int.HD dataflow*

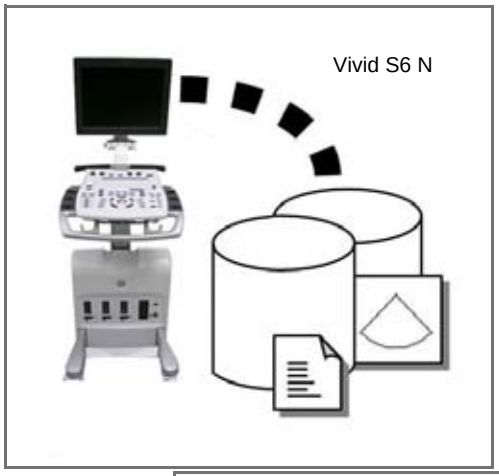
The name indicates that the local database is used for patient archiving and images are stored to internal hard drive.

A list of all the predefined dataflows is included in the Vivid S5 N and Vivid S6 N User’s Manual.

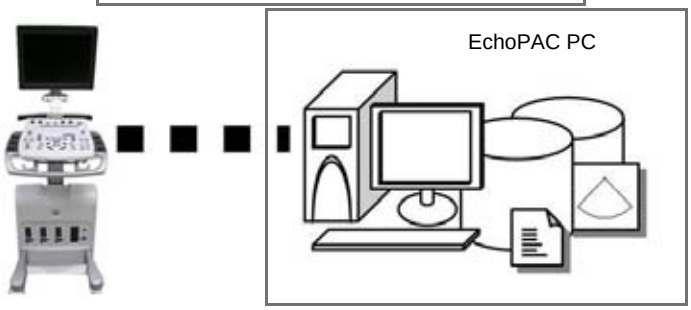
3-7-1 Connectivity Introduction (cont'd)

3-7-1-3 Dataflow Examples

LocalArchive-Int.HD dataflow:
The local database is used for patient archiving. Images are stored to internal hard drive.



RemoteArch-RemoteHD dataflow:
A remote database is used for patient archiving. Images are also stored to a remote archive.



Worklist/Local Archive-DICOMServer/Int.HD dataflow:
Search in the DICOM Modality Worklist, the patient found is copied into local database.

The patient information and the examination results are stored to the local database.

Images are stored to a DICOM server and to an image network volume on the local hard drive.

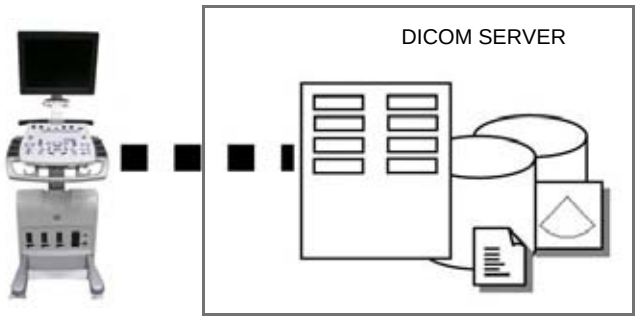


Figure 3-79 Examples of Dataflows

3-7-1-4 Stand-alone Vivid S5 N or Vivid S6 N

In this scenario, images will most likely be reviewed from a DVD or MOD media type. If digital images are stored, they should be saved directly on a MOD.

3-7-1 Connectivity Introduction (cont'd)

3-7-1-5 "Sneaker Net" Environment

In this scenario, the EchoPAC PC (one or several) is used for review of studies acquired on one or more Vivid S5 N or Vivid S6 N scanners without being connected in a network. Images can be stored on the scanner's internal hard drive (recommended) or on a dedicated MOD.

- **Images Stored on Internal Hard Drive**

  In this configuration, images are first stored on the Vivid S5 N or Vivid S6 N scanner's hard drive and then exported from the scanner's hard drive to a sneaker MOD, and finally imported from the sneaker MOD to the EchoPAC PC's internal hard drive.

- **Images Stored on Dedicated MO Disk**

  In this configuration, the images are stored directly on a dedicated MOD and imported to the EchoPAC PC's internal hard drive.

3-7-1-6 Direct Connection from Vivid S5 N or Vivid S6 N to an EchoPAC PC Workstation

In this configuration, the data is transferred from the Vivid S5 N or Vivid S6 N to a dedicated EchoPAC PC Workstation over an Ethernet connection.

The connection may be done in one of three ways:

- with a crossover cable as a Peer-to-Peer Network
- connection via a Local Area Network (LAN) - set up for this special use only.
- connection via the hospital network (Local Area Network - LAN or Wide Area Network - WAN)

The database from the EchoPAC PC is used as the master and images are stored directly to the EchoPAC PC internal hard drive.

In this configuration, the scanner is just an intermediate acquisition unit which, after completion of a study, will not contain any patient information, measurements, or images. The acquisition can be done online or offline.

3-7-1-7 Vivid S5 N or Vivid S6 N and a DICOM Server in a Network

In this configuration, the Vivid S5 N or Vivid S6 N is configured to work with a DICOM server in a network environment. Usually, this will be the hospital network. Images are first saved on the local image buffer on the scanner. At the end of the examination, the images are sent to the DICOM server via a DICOM spooler. This scenario requires that the scanner is configured to be connected to the DICOM server.

3-7-2 Physical Connection

3-7-2-1 Ethernet Switch Connections

An Ethernet Switch (P/N: 066E0741), is used to connect the Vivid S5 N or Vivid S6 N system to an EchoPAC PC and a network printer.

Informative LEDS
Ethernet Cable connectors
MDI Button Controls the fifth connector, making it crossed or non-crossed.
FS705

Figure 3-80 Ethernet Switch Identifications

Position	Label	Function
	X To PC	To connect an end station or a Server to the Port
	= To HUB	To connect a HUB or another Switch to the Port

Table 3-14 MDI Button Position Descriptions

3-7-2-2 Local Network Connection to EchoPAC PC Workstation

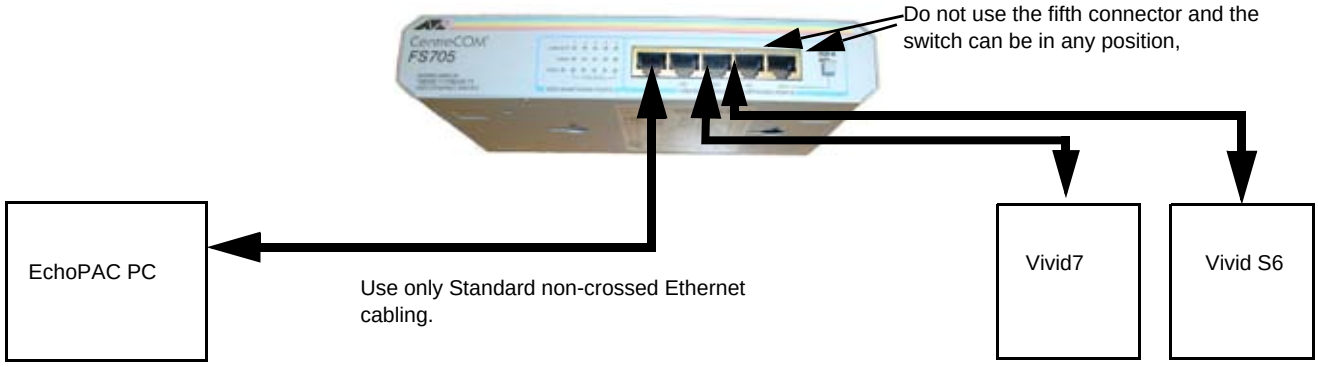

Do not use the fifth connector and the switch can be in any position,
FS705
EchoPAC PC
Use only Standard non-crossed Ethernet cabling.
Vivid7
Vivid S6

Figure 3-81 Local Network Connection

3-7-2 Physical Connection (cont'd)

3-7-2-3 Hospital Network Connection to EchoPAC PC Workstation

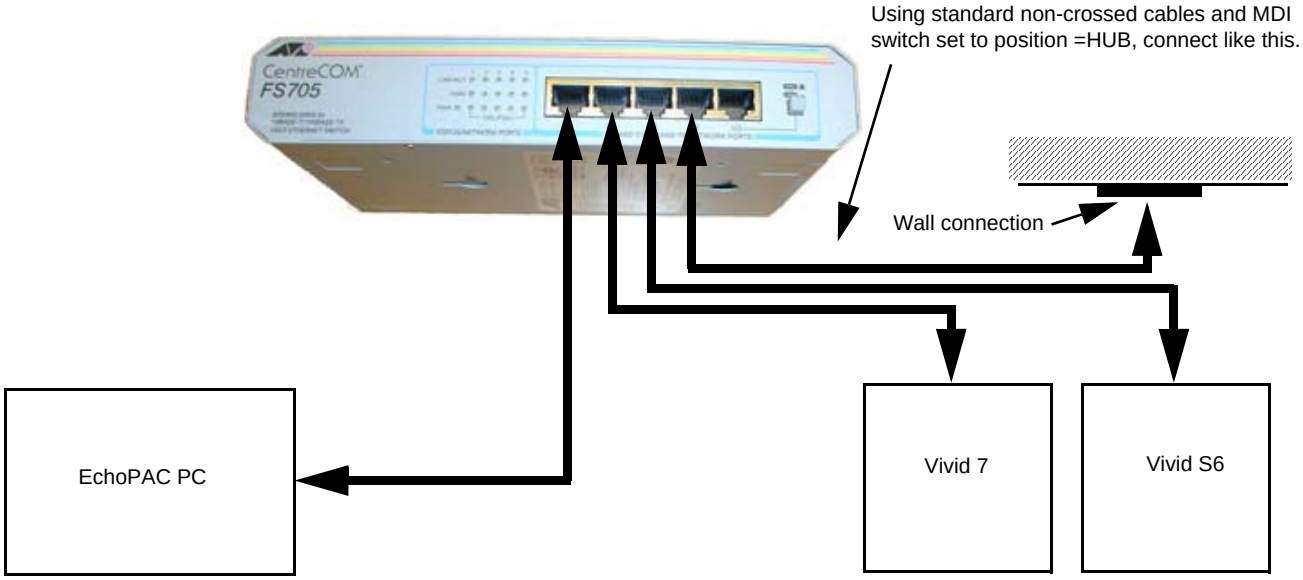

Using standard non-crossed cables and MDI switch set to position =HUB, connect like this.
CentreCOM FS705
Wall connection
EchoPAC PC
Vivid 7
Vivid S6

Figure 3-82 Hospital Network Connections

See the EchoPAC PC Service Manual (Part Number EP091298) for details about the EchoPAC PC, and the required set-up procedures.

3-7-2 Physical Connection (cont'd)

3-7-2-4 Wireless Network Configuration

The following procedure is used to configure the Vivid S5 N or Vivid S6 N system for a wireless network environment.

*NOTE: A Wireless adaptor must be connected to the **lower** USB port located at the rear of the system.*

NOTE: USB ports located at the rear of the system will be activated only after the system has loaded the main application software.

NOTE: Do not use any other type of wireless adaptor other than the LinkSys WSUB54GC WLAN card.

1.) Press **CONFIG** (**F2**) and log on as *Adm*, as described in "Log On to the System as ADM" on page 10.

2.) Select CONNECTIVITY (lower part of window).

3.) Select the TCP/IP tab.

4.) Click the **Advanced Settings** button.

The "Network Connections" dialog box is displayed:

Network Connections
File Edit View Favorites Tools Advanced Help
Search Folders
Address Network Connections
Name Type Status
LAN or High-Speed Internet
Wireless Network Connection LAN or High-Speed Inter... Not connected
Local Area Connection 2 LAN or High-Speed Inter... Connected
Wizard

Figure 3-83 Network and Dial-up Connections

5.) Select **Wireless Network Connection**, right-click and choose **View Available Wireless Networks** as shown below in:Figure 3-84 "Wireless network connection selection" on page 3-84

3-7-2 Physical Connection (cont'd)

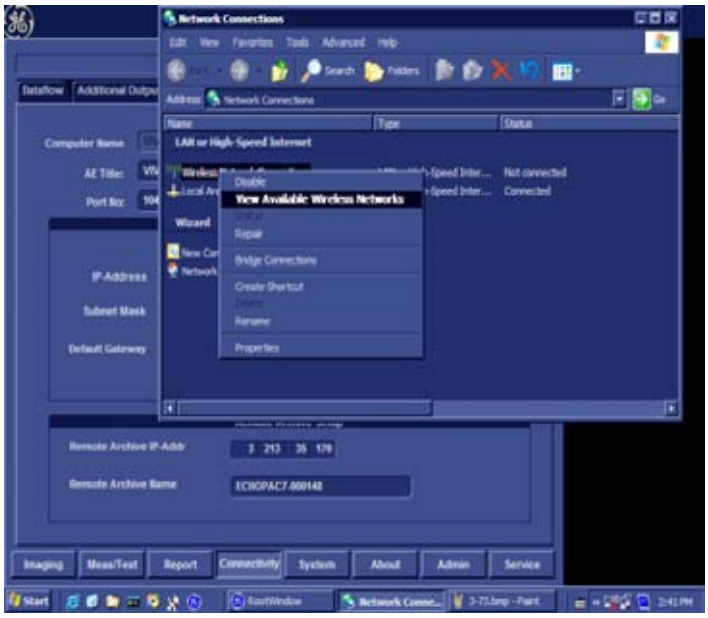


Figure 3-84 Wireless network connection selection

The Wireless Network Connection dialog box is displayed, as shown in Figure 3-85 "Wireless Network Connection Dialog Box" on page 3-84.

Figure 3-85 Wireless Network Connection Dialog Box

6.) From the list, select the appropriate wireless network detected and press **Connect** . The message below appears as shown in Figure 3-86 "Wireless Network Connection Progress Dialog" on page 3-84.

Wireless Network Connection
Please wait while Windows connects to the 'Vivid_S-Testing' network.
Detecting network type....
Cancel

Figure 3-86 Wireless Network Connection Progress Dialog

3-7-2 Physical Connection (cont'd)

7.) In the "*wireless network connection"* window, type the Network key (supplied by the Local IT group) in the *Network Key* field and press **Connect**.

Figure 3-87 Network Logon key input

The following message will appear indicating the network is connected.

Wireless Network Connection
Choose a wireless network
Vivid_S-Testing
Connected
Security-enabled wireless network
This network requires a network key. You are currently connected to this network. To disconnect from this network, click Disconnect below.

Figure 3-88 Network Connected message

3-7-2-5 Stand-alone Vivid S5 N or Vivid S6 N

No network connection needed.

3-7-2-6 "Sneaker Net" Environment

No network connection needed.

3-7-2-7 Connection from Vivid S5 N or Vivid S6 N to an EchoPAC PC Workstation

Direct Cable Connection from Vivid S5 N or Vivid S6 N to an EchoPAC PC Workstation via a Crossover Cable

You will only need a Crossover Cable for network use to connect the two units this way.

1.) Connect one end of the Crossover Cable to the network connector on the Vivid S5 N or Vivid S6 N.
2.) Connect the other end to the network connector to the EchoPAC PC Workstation, see Chapter 3 in the EchoPAC PC Workstation Service Manual.

Connection via a Peer-to-Peer Network

You will need a network hub and one network cable for each unit connected to the hub.

See 3-7-2-1 "Ethernet Switch Connections" on page 3-81.

Connection via Hospital Network

You will need one network cable to connect the Vivid S5 N or Vivid S6 N to a wall outlet on the hospital's network.

3-7-2-8 Connection between a Vivid S5 N or Vivid S6 N and a DICOM Server on a Network

You will need one network cable.

1.) Connect one end of the cable to the Ethernet connector on the Vivid S5 N or Vivid S6 N.
2.) Connect the other end of the cable to the wall outlet.

If a Peer-to-Peer Network is connected to the hospital's network, you may connect the Vivid S5 N or Vivid S6 N to the Peer-to-Peer Network.

3-7-3 Connectivity Configuration

NOTE: If connected to a stand-alone network (Peer-to-Peer network with a Vivid S5 N or Vivid S6 N *scanner, an EchoPAC PC work station and eventually a network printer), you should use default delivery settings.*

3-7-3-1 Introduction

To be able to use the network functions when connected to a hospital network, the scanner must have a proper network address.

- Before you can set up the scanner, you need to collect some information. Refer to the "Worksheet for DICOM Network Information in Figure 2-3 "Worksheet for DICOM Network Information" on page 2-11. Typically, the source for this information is the network administrator.
- Follow the steps below to prepare the scanner for use on the network.

3-7-3-2 Select TCP/IP Set-up Screen

1.) Press **CONFIG** (**F2**) and log on as *Adm*, as described in “Log On to the System as ADM” on page 10

2.) If not already selected, select CONNECTIVITY from the bottom of the screen.

3.) Select the TCP/IP TAB (it is named Tcpip).

.

Computer Name:
For Vivid S5 N and Vivid S6 N, this name is on the form:
Vivid_S6-00nnnn, where “00nnnn” is a number (nnnn is the scanner’s serial number).

IP Settings:
IP Settings area for the Vivid S5 N and Vivid S6 N scanner.

Remote Archive Setup area:
IP settings area for a Remote Archive.
Example: EchoServer.
Default Setup:
Remote Archive IP-Addr: 10.0.0.4
Remote Archive Name: EchoPAC7-000001

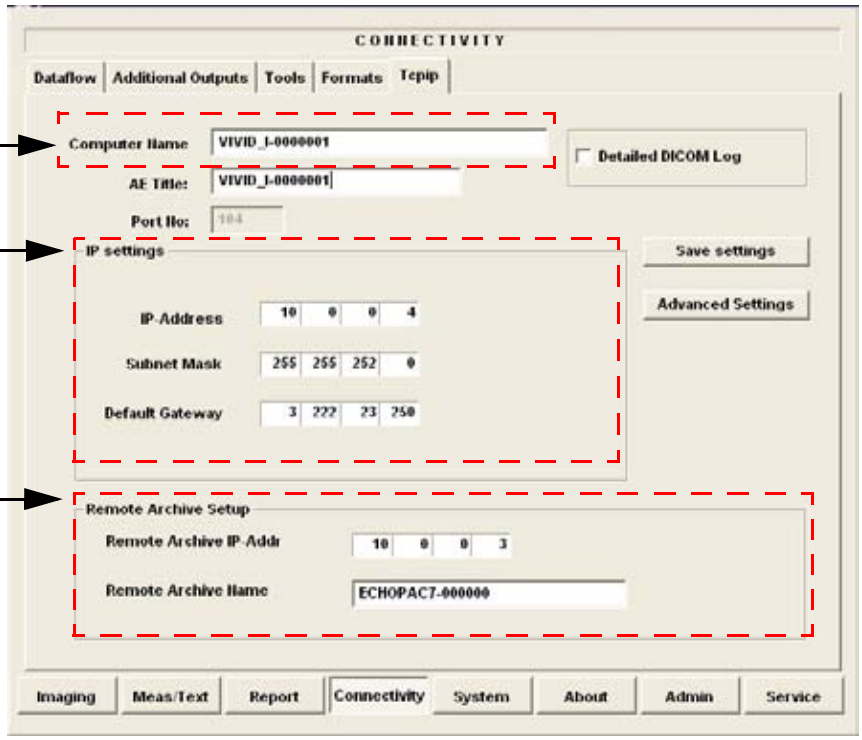


Figure 3-89 TCP/IP Set-up Screen for Vivid S5 N or Vivid S6 N, Overview (Example)

3-7-3 Connectivity Configuration (cont'd)

3-7-3-3 Set the Scanner's Network Information

In the IP settings area of the screen, enter the following:

1.) IP Address for scanner. (Default IP Address from factory: 10.0.0.3).
2.) Subnet Mask for scanner. (Default Subnet Masks from factory: 255.255.255).
3.) IP address for Default Gateway. (Default Gateways from factory IP address: 0.0.0.0).
4.) In addition, the scanner's AE Title must be entered in the DICOM server's setup.

.

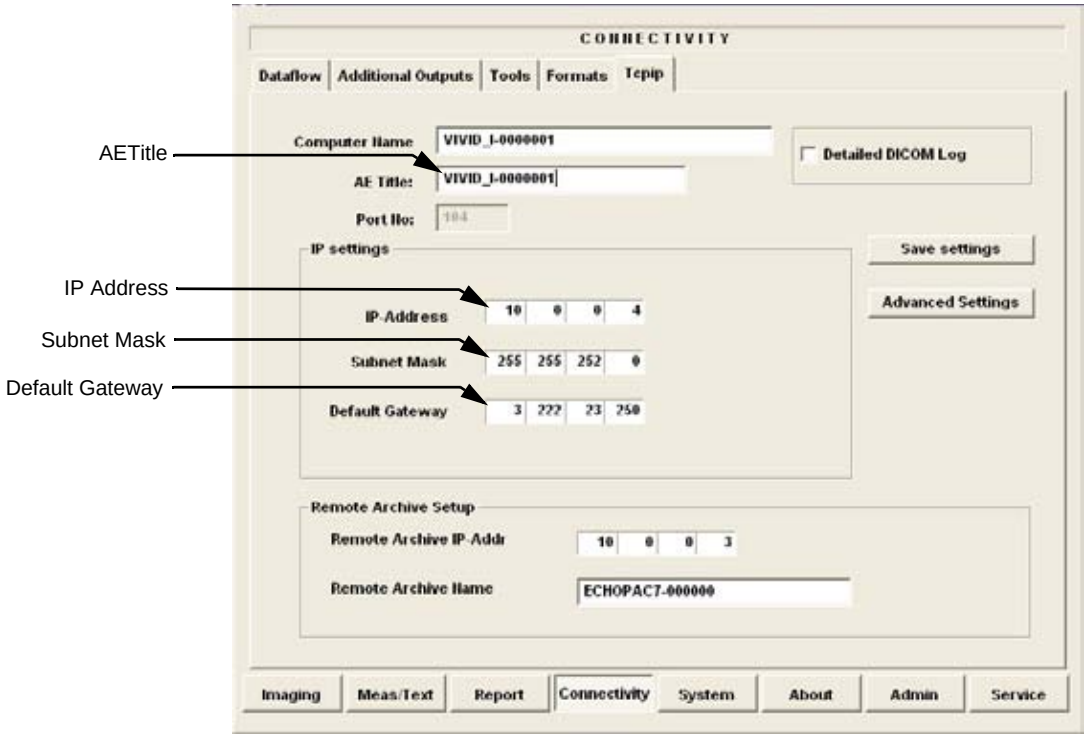


Figure 3-90 TCP/IP Set-up for Vivid S5 N or Vivid S6 N

3-7-3-4 Set the Remote Archive's Network Information

In the Remote Archive Setup area of the screen (see example in Figure 3-91 "TCP/IP Set-up for Vivid S5 N or Vivid S6 N" on page 3-88), enter the following:

1.) Remote Archive IP address. (Default IP Address from factory: 10.0.0.4).
2.) Remote Archive Name. (Default Remote Archive Name from factory: ECHOPAC7-000001).

.

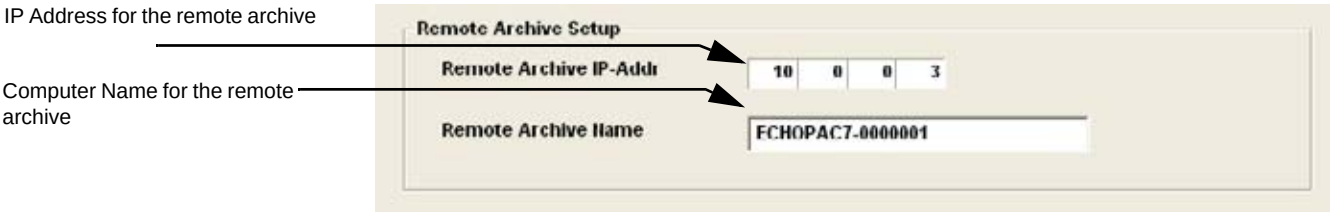


Figure 3-91 TCP/IP Set-up for Vivid S5 N or Vivid S6 N

3-7-3 Connectivity Configuration (cont'd)

3-7-3-5 Save the New Settings

1.) Press SAVE SETTINGS to save the new settings.

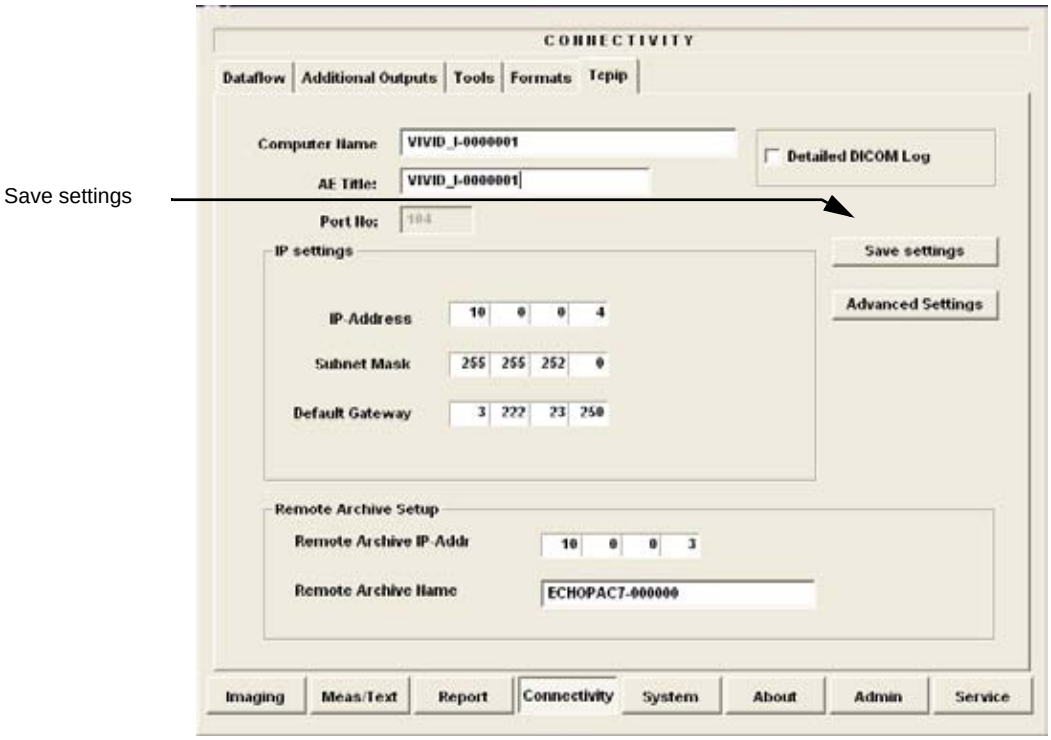


Figure 3-92 Save New TCP/IP settings

The new settings are saved to a common settings file. After a restart, the settings are also included in other screens.

2.) Restart the Vivid S5 N or Vivid S6 N system to activate the changes.

3-7-3 Connectivity Configuration (cont'd)

3-7-3-6 Configuring the Vivid S5 N or Vivid S6 N and Network PC for a Peer-to-Peer Connection

NOTE: The following steps are performed on the Vivid S5 N or Vivid S6 N scanner.
The instruction Select = trackball to the specific item and press the Set button on the control panel.

1.) On the control panel, press the **Config** button.
2.) From the System Configuration window, click the **Connectivity** tab at the bottom of the window.

The Connectivity dialog box opens.

3.) Select the **TCPIP Tab.**
4.) Trackball to the **Advanced** tab and press the **Set** button on the control panel.

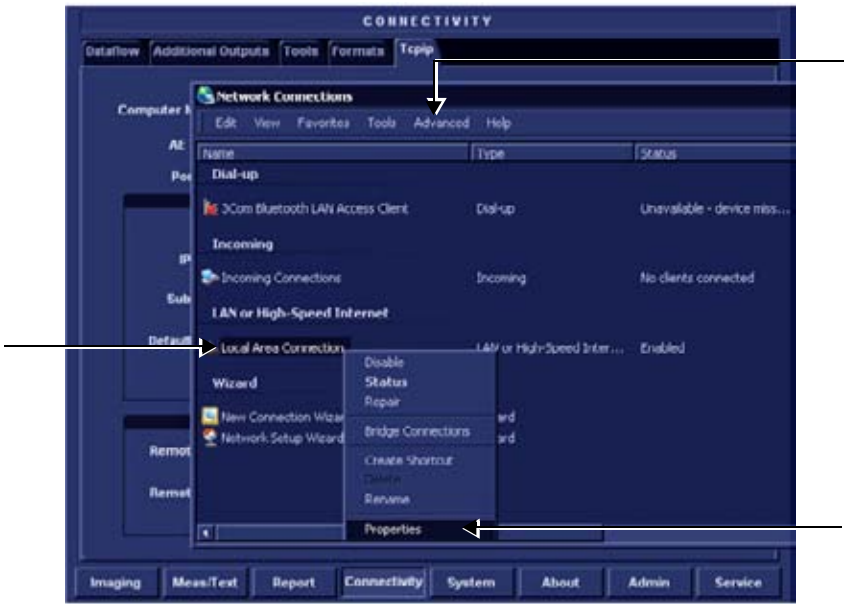


Figure 3-93 Connectivity Dialog Box - TCPIP Advanced Tab

5.) Select the **Local Area Connection**, as shown in Figure 3-93 "Connectivity Dialog Box - TCPIP Advanced Tab" on page 3-90.
6.) Press the **Menu** button on the control panel.
7.) From the drop-down menu, select **Properties**.

The Local Area Connection Properties dialog box opens.

3-7-3 Connectivity Configuration (cont'd)

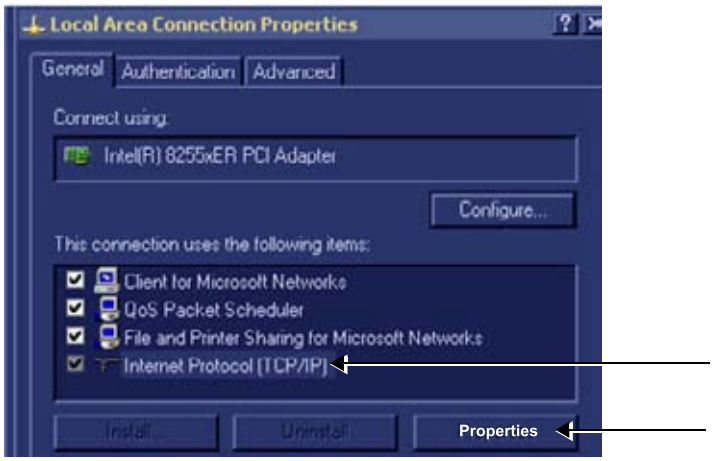


Figure 3-94 Local Area Connection Properties

8.) Select **Internet Protocol (TCP/IP)**.

9.) Click the **Properties** button.

The Internet Protocol (TCP/IP) Properties dialog box opens.

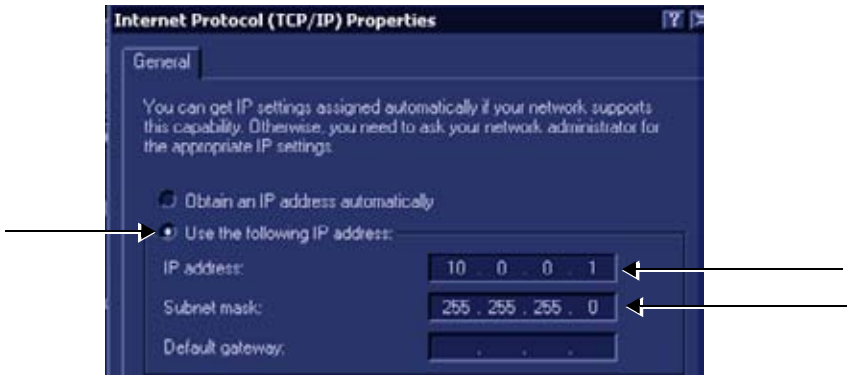

Internet Protocol (TCP/IP) Properties
General
You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.
Obtain an IP address automatically
Use the following IP address:
IP address:
10 . 0 . 0 . 1
Subnet mask:
255 . 255 . 255 . 0
Default gateway:

Figure 3-95 Internet Protocol (TCP/IP) Properties

10.) Activate the **Use the following IP address** check box.

11.) Type in the Vivid S5 N or Vivid S6 N **IP address 10.0.0.1**.

NOTE: The IP must be different from the IP address used for network computer.

12.) Type in the **Subnet mask 255.255.255.0.**

NOTE: The Subnet mask should be the same for both the network computer and the Vivid S5 N or Vivid S6 N.

13.) Click **OK**

14.) Press the **Config** button on the control panel to close all windows and return to the regular scanning mode.

NOTE: The following steps are performed on the Network Computer.

3-7-3 Connectivity Configuration (cont'd)

1) On the network computer, access the Control Panel, as follows:

   a.) Double-click on **My Computer** icon on desktop.

   b.) Double-click on **Control Pane**l icon.

2) Double-click on **Network Connections** icon.

3) Double-click on **Local Area Connection** icon.

   The Local Area Connection Properties dialog box opens.

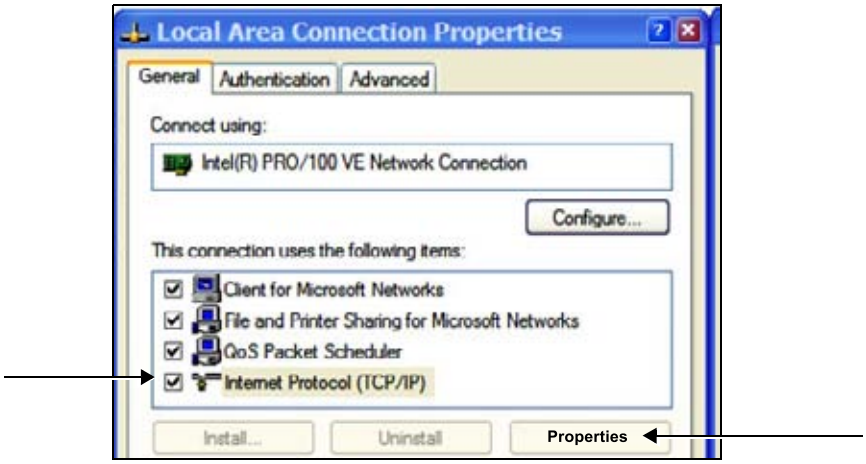


Figure 3-96 Local Area Connection Properties

4) Select **Internet Protocol (TCP/IP)**.
5) Click the **Properties** button.

   The Internet Protocol (TCP/IP) Properties dialog box opens.

3-7-3 Connectivity Configuration (cont'd)

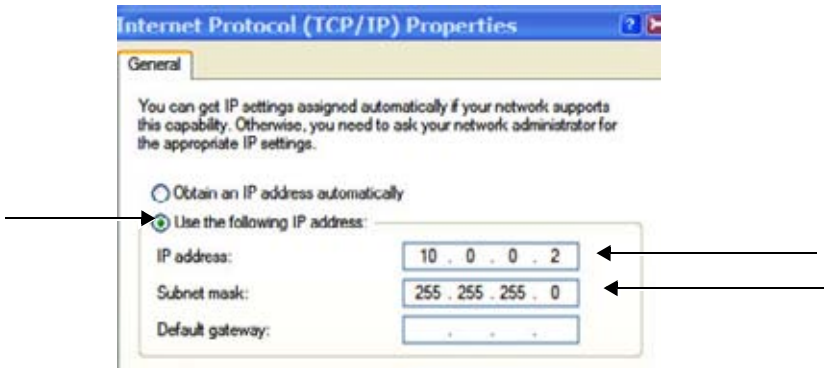

Internet Protocol (TCP/IP) Properties
General
You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.
Obtain an IP address automatically
Use the following IP address:
IP address:
10 . 0 . 0 . 2
Subnet mask:
255 . 255 . 255 . 0
Default gateway:

Figure 3-97 Internet Protocol (TCP/IP) Properties

6.) Activate the **Use the following IP address** check box.

7) Type in the network computer's **IP address 10.0.0.2**.

NOTE: The IP address must be different from the one used for the Vivid S5 N or Vivid S6 N system.

8) Type in the **Subnet mask 255.255.255.0**.

NOTE: The Subnet mask should be the same for both the network computer and the Vivid S5 N or Vivid S6 N.

9) Click **OK**, close all windows and approve all changes. Return to regular mode.

10) Connect the Vivid S5 N or Vivid S6 N and network computer LAN connection using a cross over Network cable. (Normally with RED connector covers on both sides, cable not longer than 100 meters).

The Vivid S5 N or Vivid S6 N and the network computer are now ready for export, import of files.

NOTE: One can check the connection by pinging to the Vivid S5 N or Vivid S6 N IP, as follows:

a.) Select <**Start**>, <**Run**>
b.) Type **CMD**, then press <**Enter**>
c.) Type **Ping** and **IP 10.0.0.1** for Vivid S5 N or Vivid S6 N then press <**Enter**>.

If return timing is OK, you have an operating network connection.

3-7-3-7 Configuring the Vivid S5 N or Vivid S6 N and Network PC for a LAN Connection

NOTE: The following steps are performed on the Vivid S5 N or Vivid S6 N scanner.
The instruction Select = trackball to the specific item and press the Set button on the control panel.

1.) On the control panel, press the **Config** button.
2.) From the System Configuration window, click the **Connectivity** tab at the bottom of the window.

The Connectivity dialog box opens.

3-7-3 Connectivity Configuration (cont'd)

3.) Select the **TCPIP Tab.**

4.) Trackball to the **Advanced** tab and press the **Set** button on the control panel.

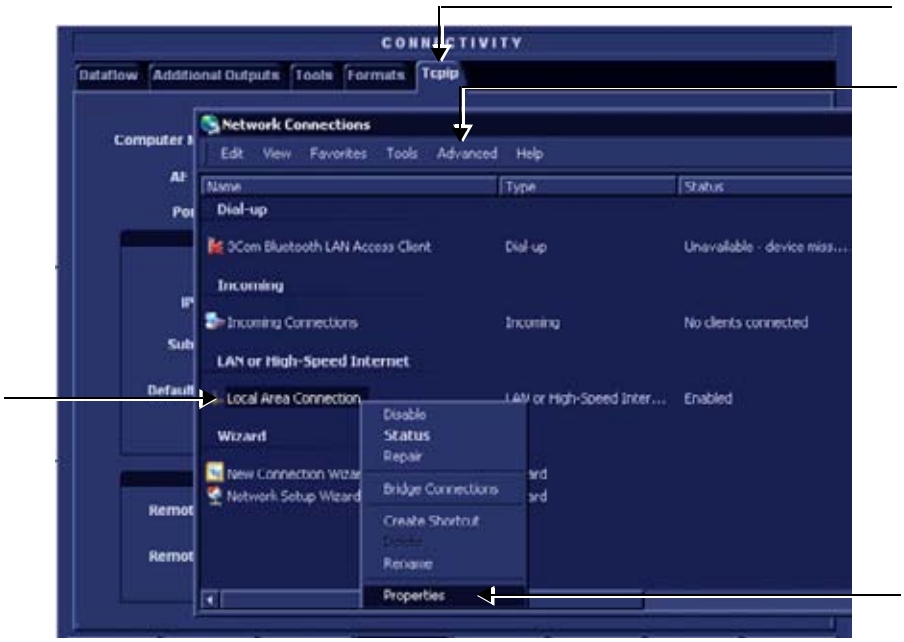


Figure 3-98 Connectivity Dialog Box - TCPIP Advanced Tab

5.) Select the **Local Area Connection**, as shown in Figure 3-93 "Connectivity Dialog Box - TCPIP Advanced Tab" on page 3-90.

6.) Press the **Menu** button on the control panel.

7.) From the drop-down menu, select **Properties**.

The Local Area Connection Properties dialog box opens.

Figure 3-99 Local Area Connection Properties

8) Select **Internet Protocol (TCP/IP)**.

3-7-3 Connectivity Configuration (cont'd)

9) Click the **Properties** button.

The Internet Protocol (TCP/IP) Properties dialog box opens.

Internet Protocol (TCP/IP) Properties
General
You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.
Obtain an IP address automatically
Use the following IP address:
IP address:
10 . 0 . 0 . 1
Subnet mask:
255 . 255 . 255 . 0
Default gateway:

Figure 3-100 Internet Protocol (TCP/IP) Properties

10.) Activate the **Use the following IP address** check box.

11.) Type in the Vivid S5 N or Vivid S6 N **IP address 10.0.0.1** or the one provided by the local network administrator.

NOTE: The IP must be different from the IP address used for network computer.

12.) Type in the **Subnet mask 255.255.255.0** or the one provided by the local network administrator.

NOTE: The Subnet mask should be the same for both the network computer and the Vivid S5 N or Vivid S6 N.

13.) Click **OK**

14.) Press the **Config** button on the control panel to close all windows and return to the regular scanning mode.

3-7-3 Connectivity Configuration (cont'd)

NOTE: The following steps are performed on the Network Computer.

1) On the network computer, access the Control Panel, as follows:

   a.) Double-click on **My Computer** icon on desktop.

   b.) Double-click on **Control Pane**l icon.

2) Double-click on **Network Connections** icon.

3) Double-click on **Local Area Connection** icon.

   The Local Area Connection Properties dialog box opens.

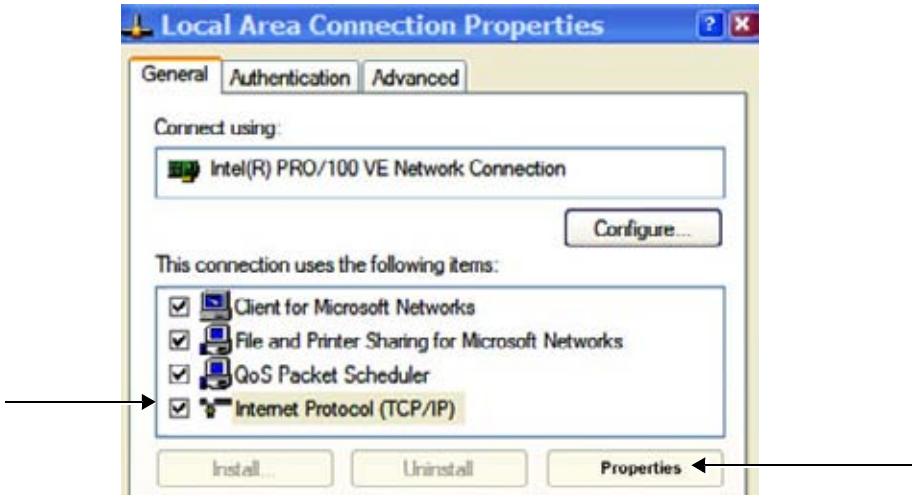


Figure 3-101 Local Area Connection Properties

4) Select **Internet Protocol (TCP/IP)**.
5) Click the **Properties** button.

3-7-3 Connectivity Configuration (cont'd)

The Internet Protocol (TCP/IP) Properties dialog box opens.

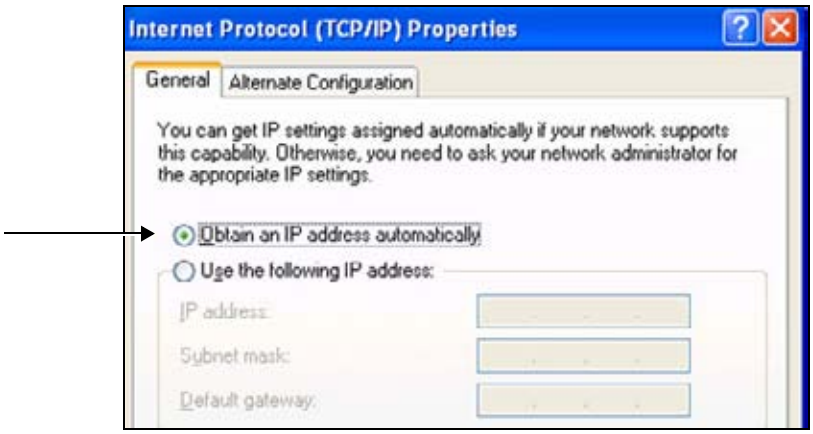

Internet Protocol (TCP/IP) Properties
General
Alternate Configuration
You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.
Obtain an IP address automatically
Use the following IP address:
IP address:
Subnet mask:
Default gateway:

Figure 3-102 Internet Protocol (TCP/IP) Properties

6.) Activate the **Obtain an IP address automatically** check box.

7) Click **OK**, close all windows and approve all changes. Return to regular mode.

8) Connect the Vivid S5 N or Vivid S6 N and network computer LAN connection using a regular Network cable.

The Vivid S5 N or Vivid S6 N and the network computer are now ready for export, import of files.

NOTE: One can check the connection by pinging to the Vivid S5 N or Vivid S6 N IP, as follows:

a.) Select <**Start**>, <**Run**>
b.) Type **CMD**, then press <**Enter**>
c.) Type **Ping** and **IP 10.0.0.1** for Vivid S5 N or Vivid S6 N then press <**Enter**>.

If return timing is OK, you have an operating network connection.

3-7-4 Set Up Connection to a DICOM Server in a Network

In this case, the Vivid S5 N or Vivid S6 N is configured to work with a DICOM server in a network environment. Images are first saved on the local image buffer on the scanner. At the end of the examination, the images are sent to the DICOM server via a DICOM spooler.

This scenario requires that the scanner is configured to be connected to the DICOM server as described below.

3-7-4-1 Overview

To work against the DICOM server, the following information has to be entered in the scanner:

- DICOM server IP address.
- DICOM server port number.
- DICOM server AE title (the server application's name).
- Name of Device.

3-7-4-2 DICOM Server IP Address Setting on the Scanner

1.) Press **CONFIG** (**F2**) and log on as *Adm*, as described in "Log On to the System as ADM" on page 10.

2.) Select CONNECTIVITY (in the lower part of the window).

3.) Select the DATAFLOW tab.

4.) Select the arrow to the right of the Name field to list all dataflows in a pull-down menu, see Figure 3-103 "Select Dataflow" on page 3-98.

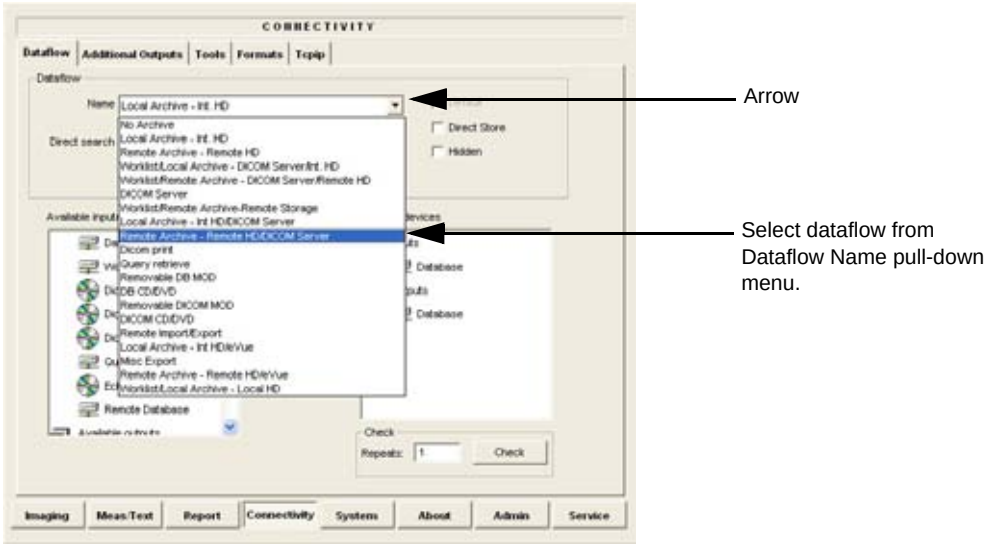


Figure 3-103 Select Dataflow

5.) From the Dataflow Name pull-down list, select the dataflow you want to configure - see Figure 3-103 "Select Dataflow" on page 3-98.

The selected flow is shown, as seen in the example in Figure 3-104 "Worklist/Local Archive - DICOM Server/Int. HD Flow" on page 3-99 (Worklist/Local Archive - DICOM Server/Int. HD).

3-7-4 Set Up Connection to a DICOM Server in a Network (cont'd)

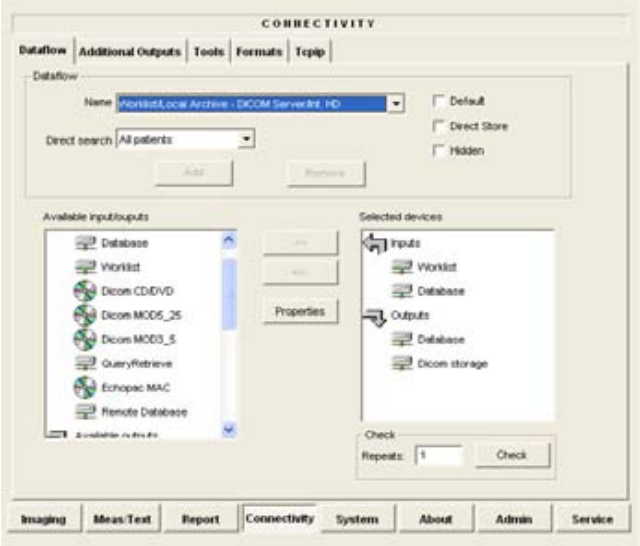


Figure 3-104 Worklist/Local Archive - DICOM Server/Int. HD Flow

6.) Select **Worklist** (so it is highlighted) and then select **Properties** to display the Properties dialog.

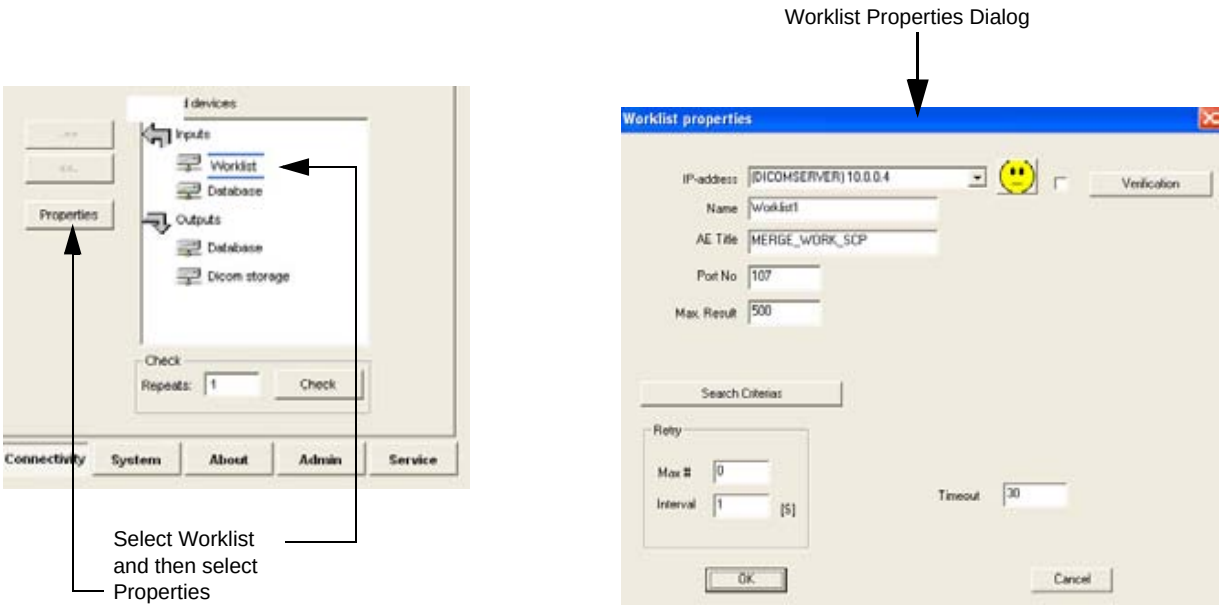


Figure 3-105 Select Worklist Properties Dialog Box

7.) Select the IP-Address down-arrow to choose the Worklist Server from the pull-down menu.

NOTE: It is not possible to change the setting in the IP-Address field by editing it. See description below, starting with step 8, to change the setting.

3-7-4 Set Up Connection to a DICOM Server in a Network (cont'd)

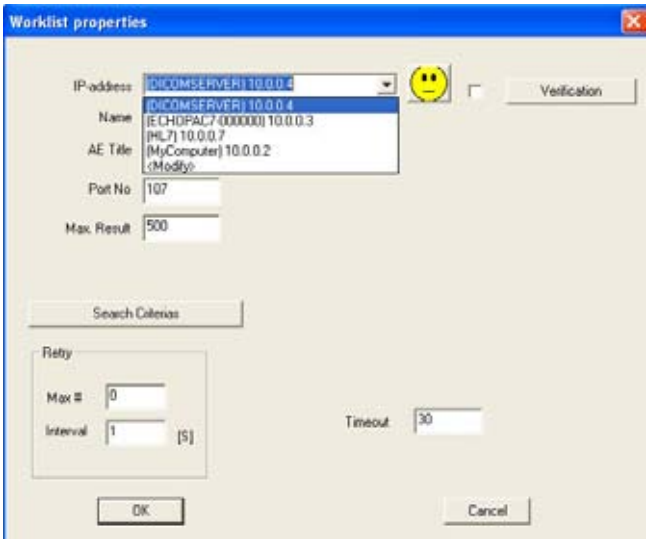


Figure 3-106 DICOM Server's Properties Dialog Box

8.) Follow the steps below to change the IP-Address settings:

a.) From the IP-Address pull-down menu, select <**Modify**> to display the IPs dialog box.

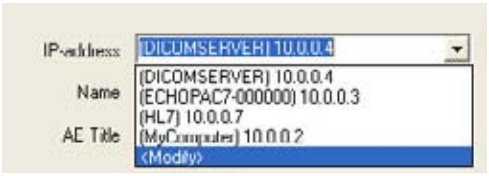


Figure 3-107 Select <Modify>

b.) From the IPs dialog box, select the server you want to modify, then select **Modify**.

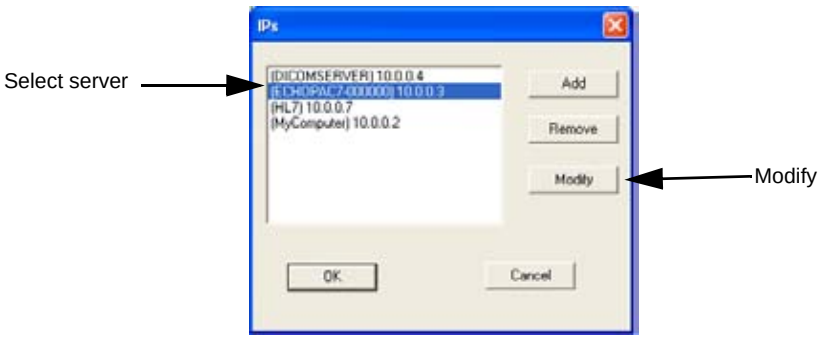


Figure 3-108 Select the Unit to Modify

c.) Edit the name and/or the IP address of the server, see Figure 3-109 "Edit Name and/or IP address" on page 3-101.

3-7-4 Set Up Connection to a DICOM Server in a Network (cont'd)

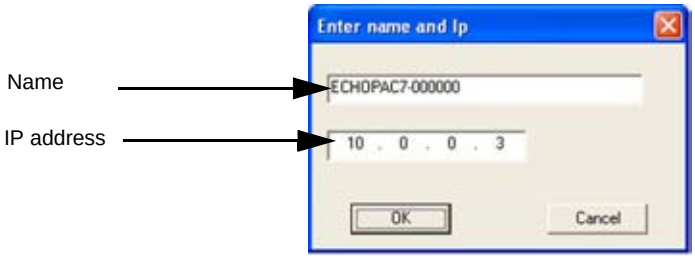


Figure 3-109 Edit Name and/or IP address

d.) Click **OK** to save the new settings and close the Edit Name dialog box.

e.) Click **OK** to close the IPs dialog to return to the Properties dialog box.

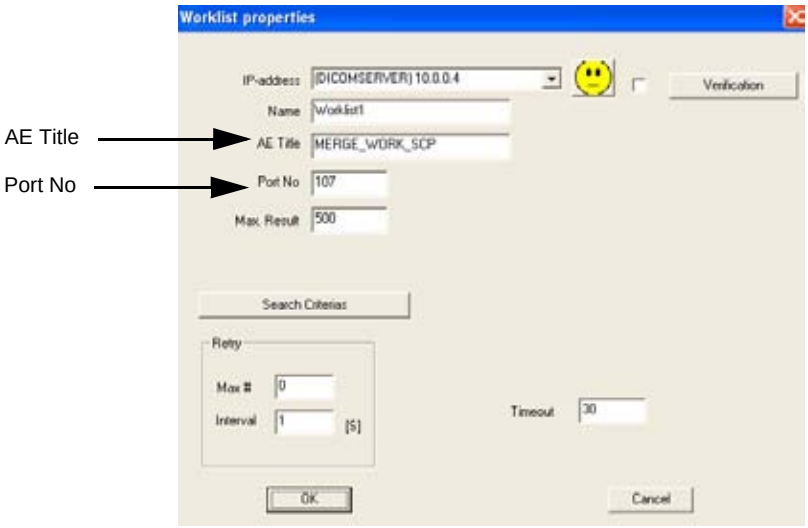


Figure 3-110 DICOM Server's Properties Dialog Box

f.) Enter the DICOM server AE Title. This entry is case-sensitive and must match exactly.

g.) Enter the DICOM server port.

h.) For some DICOM Servers, the default Time-out setting (30) is too low. Change if necessary by typing a new value (seconds).

i.) Click **OK** to close the Worklist Properties dialog box and save the changes.

3-7-4-3 Verify the Connection to a Device

1.) Select (highlight) the device to which you want to verify the connection.

3-7-4 Set Up Connection to a DICOM Server in a Network (cont'd)

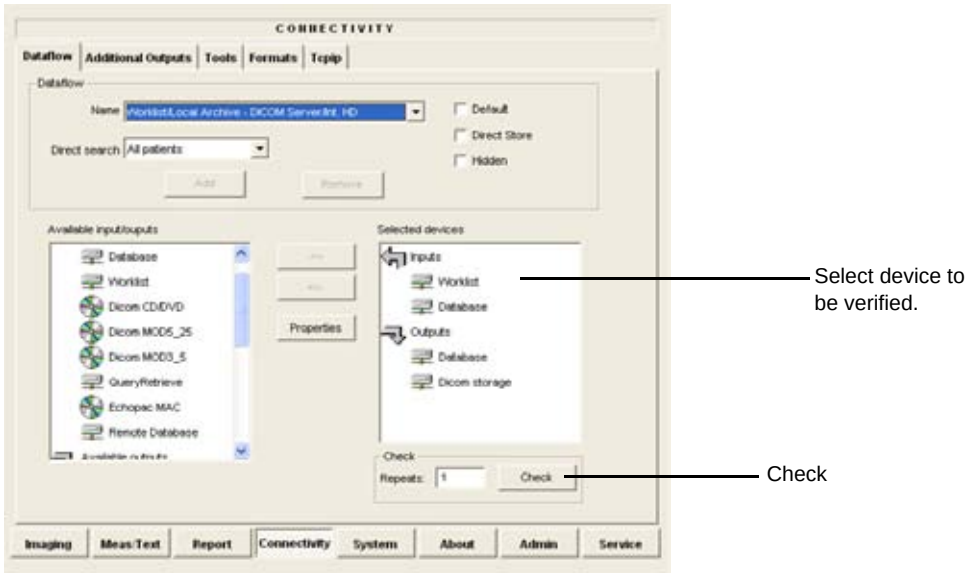


Figure 3-111 Verify Connection to a Device

2.) Select CHECK to start the connection to the device verification process.
The verification process may require up to one minutes. When done, a sign (prefix) displayed in front of the listed device indicates whether the test passed (green check-mark) or failed (red X).

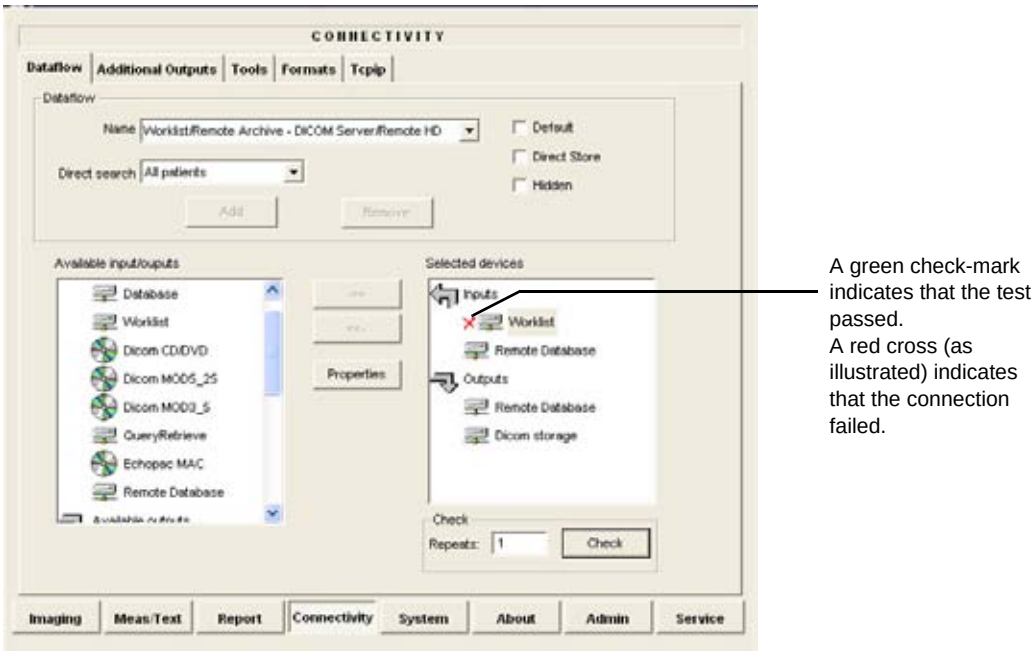


Figure 3-112 Verification Result

3-7-5 Setup Connection to HL7 Server in a Network

3-7-5-1 Introduction

The procedures below describe how to set up the Vivid S5 N or Vivid S6 N workstation so it can connect to the Hospital Information System (HIS), via the Vivid HL7 Gateway. By connecting to the HIS, demographic information (i.e. *Patient ID*, *Name*, *Gender, etc*.) can be retrieved from the HIS, reducing "double-work" and typing errors. Patient Reports can be sent back to the HIS for storage, together with the rest of the Patient records.

3-7-5-2 Preparations

1.) Before you can set up the HL 7 Communication, you need to collect some information:
- The IP address of the Vivid HL7 Gateway
- Port Number used by the Vivid HL7 Gateway (Default port: 3320)

Typically, source for this information is the Mitra support personnel.

The "Worksheet for DICOM Network Information" on page 11 can be used for gathering this information.

2.) Provide the computer name of each EchoPAC PC Workstation and Vivid S5 N or Vivid S6 N being configured to the Mitra support personnel.

3-7-5-3 Configuration of Modality Worklist Services

Identify Dataflow to be Used

1.) Identify which dataflow is to be used at the site. If the DICOM Modality Worklist will be used, then the dataflow must include a Worklist service.
2.) On the Connectivity screen, select the **Dataflow** tab.
3.) From the pull-down menu, select the name of the site's dataflow.
4.) In the *Services* section, locate the **Worklist** service.
5.) Record the service's name and destination device.

Configure the DICOM Worklist Service

1.) Select the **Services** tab.
2.) Select the Worklist destination device from the pull down menu.
3.) Enter the IP address of the Vivid HL7 Gateway.
4.) Enter a descriptive name in the Name field.
(Example: Vivid HL7 Gateway. The use of this field is optional).
5.) Enter AE Title. Use the Computer Name for the unit you are configuring.
6.) Enter Port Number. (Port 3320 is the default, but Mitra may have provided another port number).
7.) Set Time-out to 90.
8.) Leave the rest of the fields unchanged.

Configure the Search Criterias

NOTE: This configuration is required.

1.) Click the **Search Criterias** button.
2.) Select the criteria **Modality** and click the **Remove** button.

3-7-5 Setup Connection to HL7 Server in a Network (cont'd)

3.) Press the **OK** button.

Configure Search Criteria: Constrain Query by AE Title

NOTE: This configuration is optional. It should only be performed if the site is directing orders to the Vivid S5 N or Vivid S6 N that is scheduled to perform the study.

Please contact the Mitra support personnel to verify that this step is needed.

1.) In the *Search Criterias* dialog box, select **00400001 Scheduled Station AE Title** from the *Select Tag* pull-down menu.
2.) Enter the Vivid S5 N or Vivid S6 N computer name for the Value.
3.) Click the **Add to List** button.
4.) Click the **OK** button.

Configure Search Criteria: Constrain Query by MRN

NOTE: This configuration should be performed if the site will need to constrain the Worklist queries by MRN (patient id)

1.) In the *Search Criterias* dialog box, select **00101000 Other Patient IDs** from the *Select Tag* pull-down menu.
2.) Enter a 9 digit number for the Value.
3.) Click the **Add to List** button.
4.) Click the **OK** button.

Assign DICOM Worklist name to Dataflow

1.) Select the Dataflow tab.
2.) From the *Dataflow name* pull-down menu, select the Dataflow which will be used.
3.) Remove the DICOM Worklist service currently used in the Dataflow.
4.) From the *Select Service* pull-down menu, select the **Gateway Modality Worklist** service.
5.) Click the **Add** button.
6.) Ensure that the service is displaying the value **In** for the Dir parameter and that its role is **Primary**.

Test Connectivity with the Vivid HL7 Gateway

The purpose of this test is to verify that the Vivid S5 N or Vivid S6 N has connectivity with the Vivid HL7 Gateway.

1.) From either the Current or Dataflow view, expand the Dataflow incorporating the Gateway Modality Worklist service.
2.) Expand the Gateway destination device.
3.) Select the **Gateway Modality Worklist** service.
4.) Click the **Check** button.
    - If connectivity was achieved, then a green check should be displayed next to the name of the Gateway's Modality Worklist service.

3-7-5 Setup Connection to HL7 Server in a Network (cont'd)

- If connectivity was not achieved, then there will be a red X next to the name of the Gateway's Modality Worklist service.

Troubleshoot Connectivity with the Gateway

If connection between the Vivid S5 N or Vivid S6 N and the HIS failed, the following are typical causes:

1.) No network connection.
2.) IP address and/or port number was incorrectly entered when configuring the Gateway Modality Worklist service.
3.) Mitra support personnel have not yet configured the Gateway to accept Modality Worklist queries from the Vivid S5 N or Vivid S6 N.

Verify that the Vivid S5 N or Vivid S6 Ncomputer name matches the value specified for the Gateway Modality Worklist service and that it also matches the value supplied to the Mitra support personnel.

Configure the Export to HL7 Path

1.) Enter the configuration screen for the EchoPAC PC.
2.) Press the **Connectivity** button.
3.) Select the **Tools** tab.
4.) In the section labeled *Export Paths*, make the following changes:
   a.) For the Export To HL7 path, enter the following information:
   \\ < Name or IP Address of the Vivid HL7 Gateway>\POLL_DIR
   Example: \\Gateway\POLL_DIR
   b.) Verify that Text is select for the Export file format.

Test Connectivity with the Vivid HL7 Gateway

1.) Start a new study and acquire an image, or use an existing study.
2.) In the Measurements mode, make some of the measurements.
3.) In the Report screen, create and store a report.
4.) In the Patient screen, from the Examination List, select the study in which you created the report.
5.) From the *More* pull-down menu, select **HL7 Results**.

   If the export was successful, the following message is displayed:
   Export exam status: OK.

   If the export was unsuccessful, the following message (or similar) is displayed:
   Export exam status: Unable to copy file.

Troubleshoot Connectivity with the Vivid HL7 Gateway

If Connectivity with the Vivid HL7 Gateway failed, the following are typical causes:

1.) Path provided in Export to HL7 export path was incorrect.
2.) Mitra support personnel did not create the user account for the Vivid S5 N or Vivid S6 N.
3.) The POLL_DIR directory on the Vivid HL7 Gateway was not shared or the permissions are incorrect. Verify with Mitra support personnel.
4.) Domain or other network issue.

3-7-5 Setup Connection to HL7 Server in a Network (cont'd)

5.) If Report files (ReportXXX.chm) are not exported to the Vivid HL7 Gateway, then the reports may not have been stored when they were created on the Vivid S5 N or Vivid S6 N.

3-7-6 Query/Retrieve (Q/R) Setup

3-7-6-1 Overview

The Query/Retrieve function makes it possible to search for and retrieve DICOM data from a DICOM server for further analysis on the Vivid S5 N or Vivid S6 N.

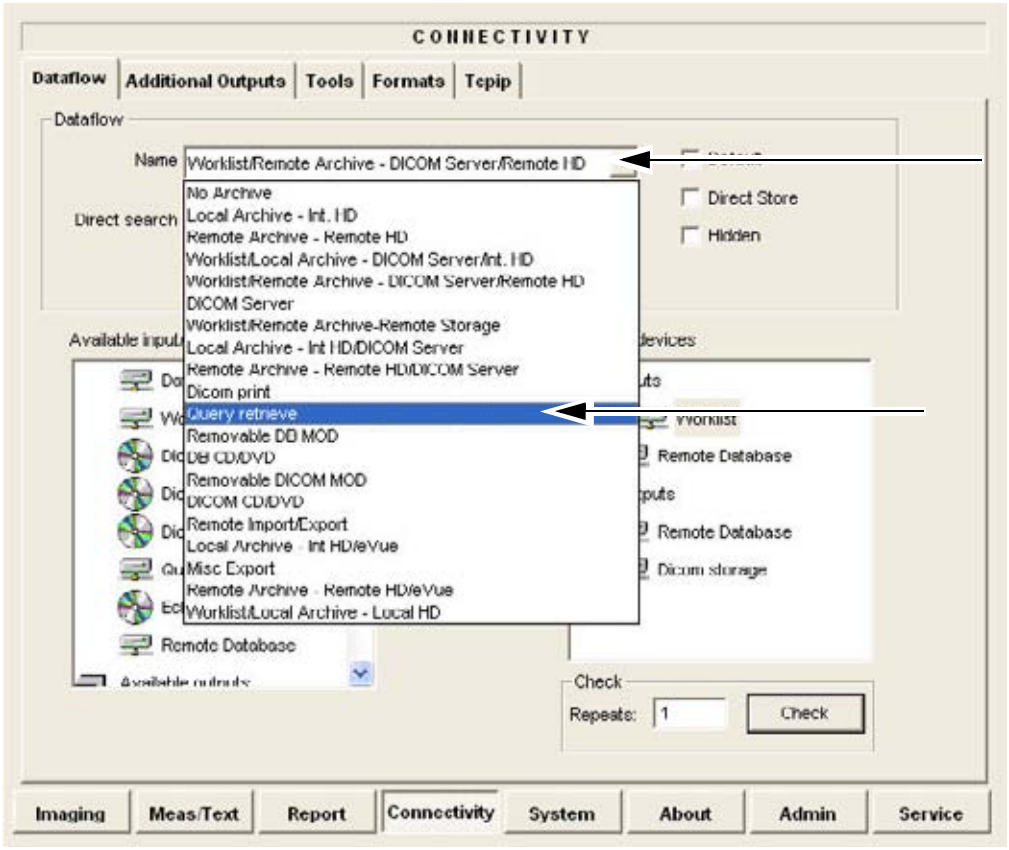
3-7-6-2 Query/Retrieve Setup on the Vivid S5 N or Vivid S6 N

1.) Press **CONFIG** (**F2**) and log on as *Adm*, as described in “Log On to the System as ADM” on page 10

2.) Select **Connectivity**.

3.) Select **Dataflow**.

4.) Select **Query Retrieve** from the *Name* pull-down menu - see Figure 3-115 "Select Query/Retrieve's Properties" on page 3-108.



NAME PULLDOWN MENU

QUERY RETRIEVE

Figure 3-113 Select Query Retrieve

The selected dataflow (Query/Retrieve), is displayed as shown in Figure 3-114 "Query/Retrieve Workflow" on page 3-108.

3-7-6 Query/Retrieve (Q/R) Setup (cont'd)

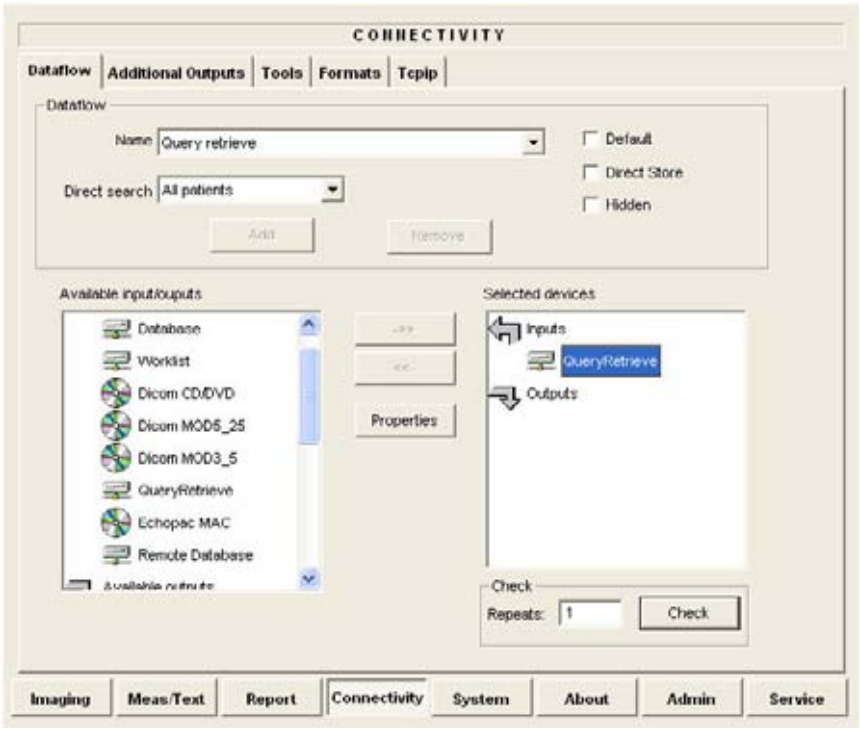


Figure 3-114 Query/Retrieve Workflow

5.) Select **QueryRetrieve** so it is highlighted and then select **Properties** to display the Properties dialog box.

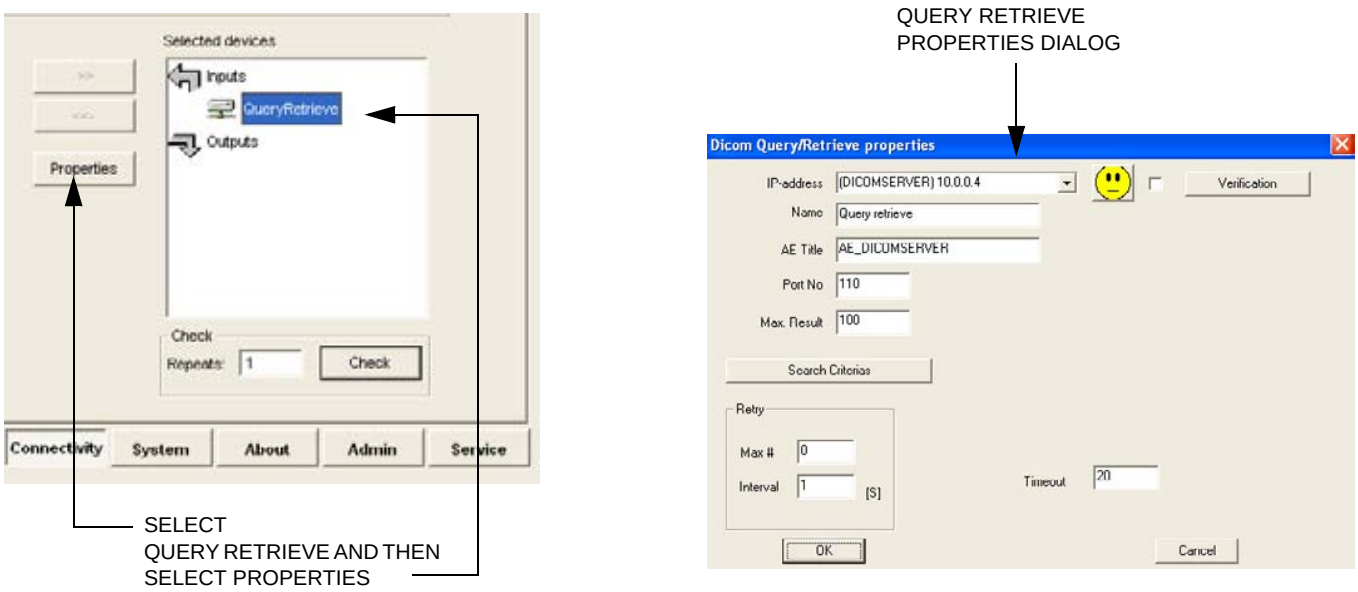


Figure 3-115 Select Query/Retrieve's Properties

3-7-6 Query/Retrieve (Q/R) Setup (cont'd)

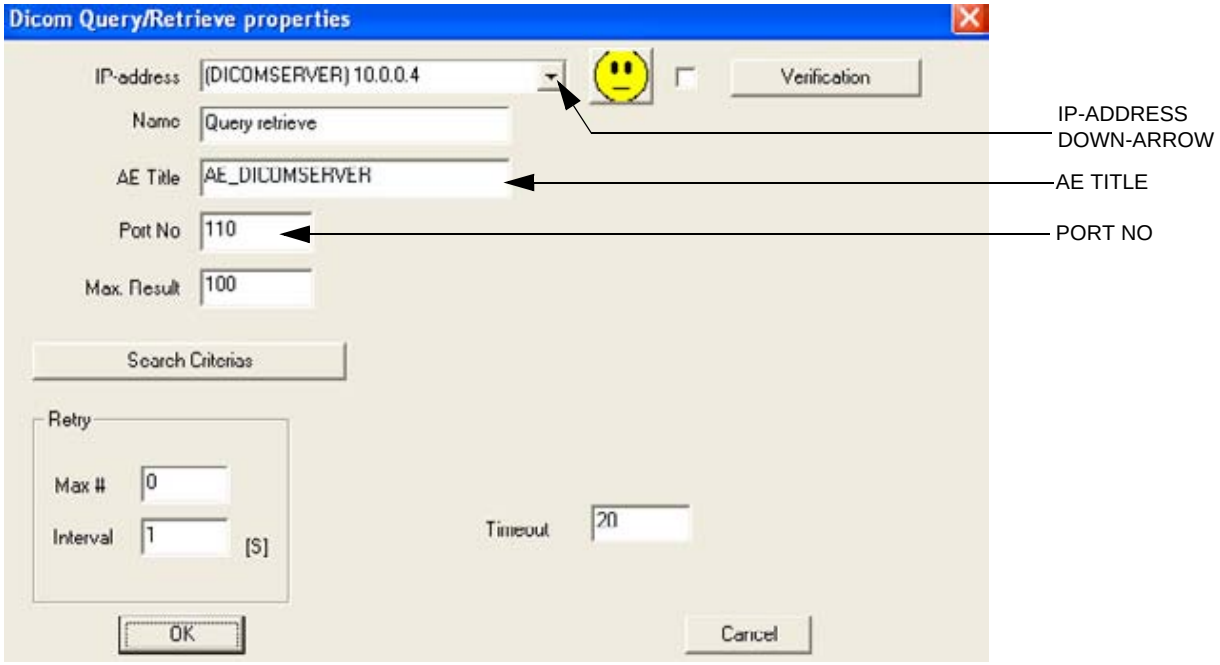


Figure 3-116 DICOM Query/Retrieve properties

6.) Select the IP-address down-arrow to choose the DICOM Query/Retrieve server from the pull-down menu. In some cases, the server to use is the same as used for DICOM Storage.

If the server to use is missing from the list, select <**Modify**> from the pull-down menu and edit the setup for one of the predefined servers.

7.) Enter the correct AE Title and Port Number for the DICOM Query/Retrieve server in the respective fields in the Query/Retrieve screen.

Change Search Criterias

It is possible to set up special Search Criterias for DICOM Query/Retrieve. In most cases you may leave the Search Criterias as is, and skip this adjustment.

Follow the steps below to change the Search Criterias parameters:

1.) Select Search Criterias

3-7-6 Query/Retrieve (Q/R) Setup (cont'd)

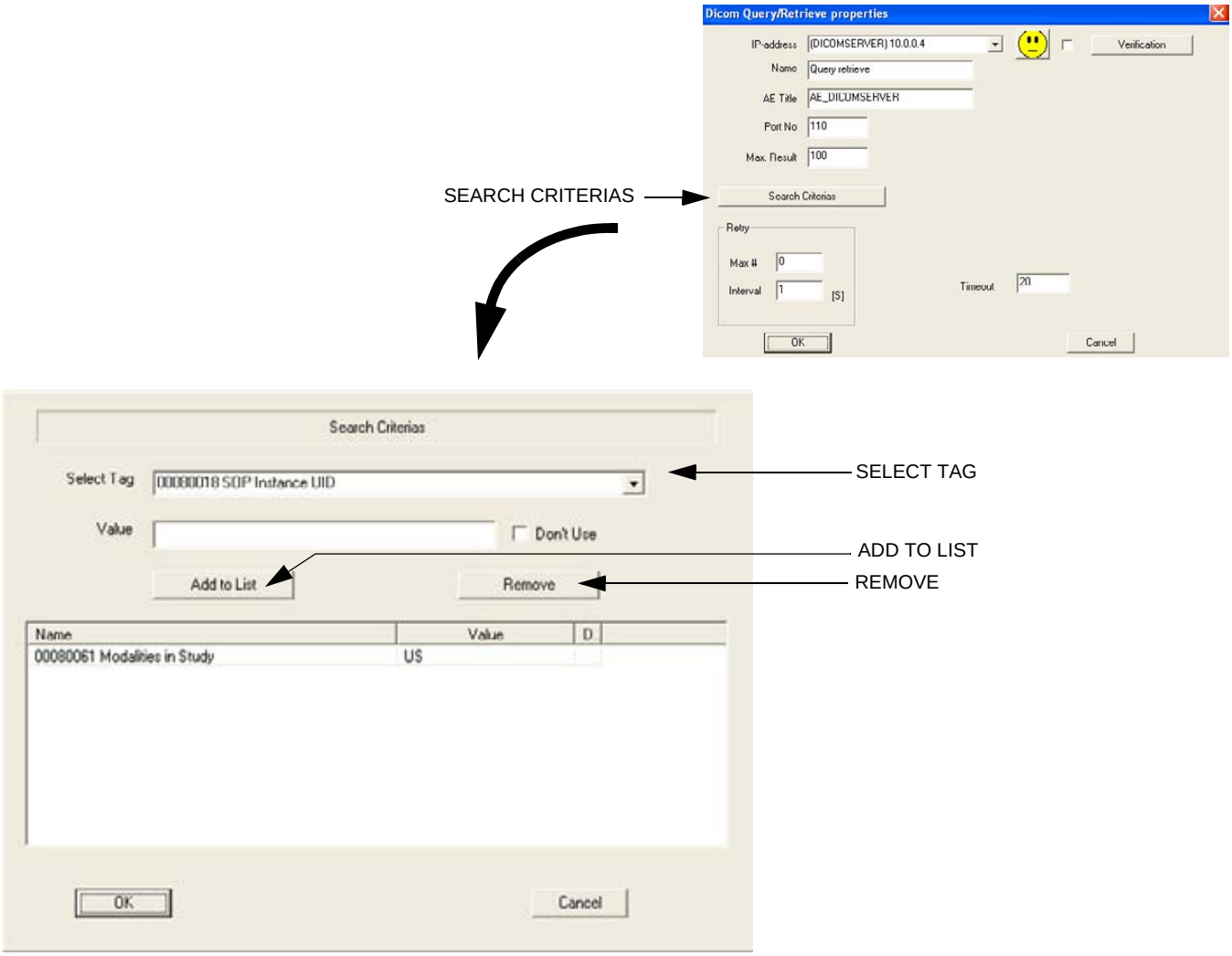


Figure 3-117 Select Search Criterias

2.) Select the correct tag from the *Select Tag* pull-down menu.
3.) If needed, type in the value.
4.) Select **Add to List**.
5.) Click **OK** to close the Search Criterias window.

3-7-6 Query/Retrieve (Q/R) Setup (cont'd)

3-7-6-3 Query/Retrieve Verification

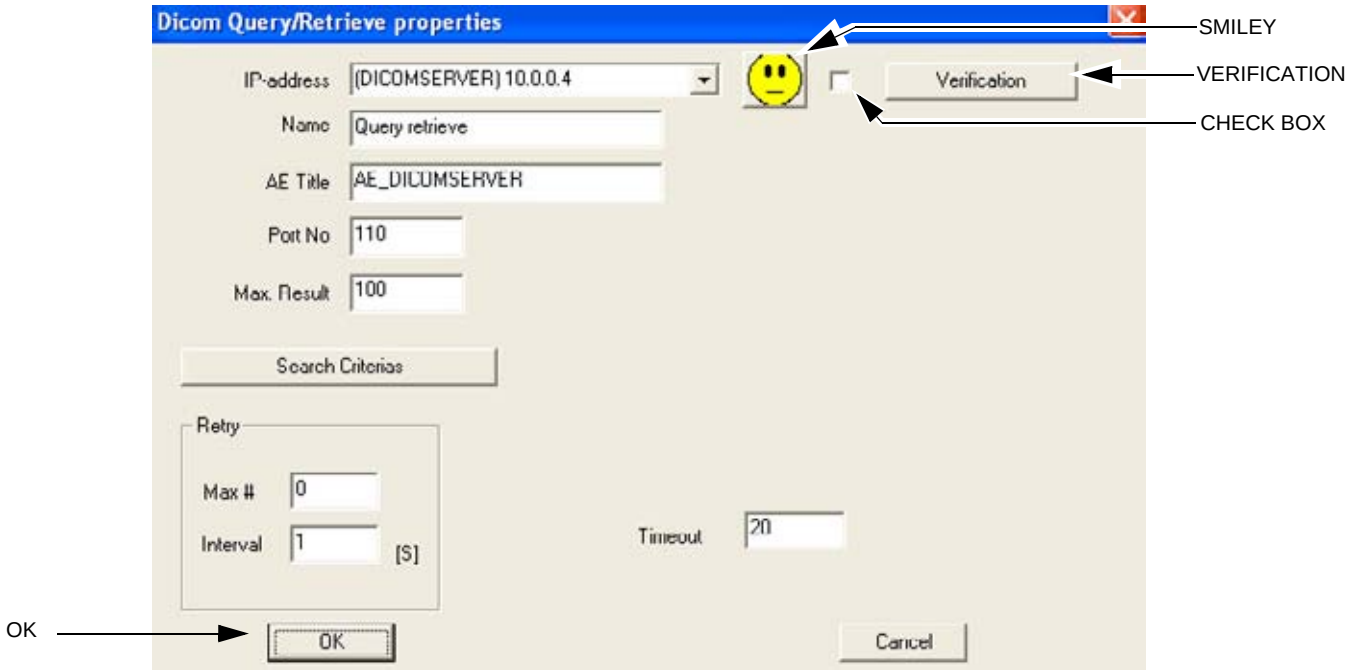


Figure 3-118 DICOM Query/Retrieve Properties

Follow the Steps Below to do a First Test (Ping) of the Connection

1.) Select the Smiley button to Ping the server.

2.) If the network connection to the server is OK, it will be illustrated by a smiling Smiley .
A sad Smiley indicates that the network connection is failing.
Typical cause: Network cable not connected.

3.) When ready, click **OK** to close the DICOM Query/Retrieve properties and save changes.

3-7-6 Query/Retrieve (Q/R) Setup (cont'd)

Follow the Steps Below to Test the DICOM Query/Retrieve Workflow

NOTE: This check uses both Ping and DICOM Ping.

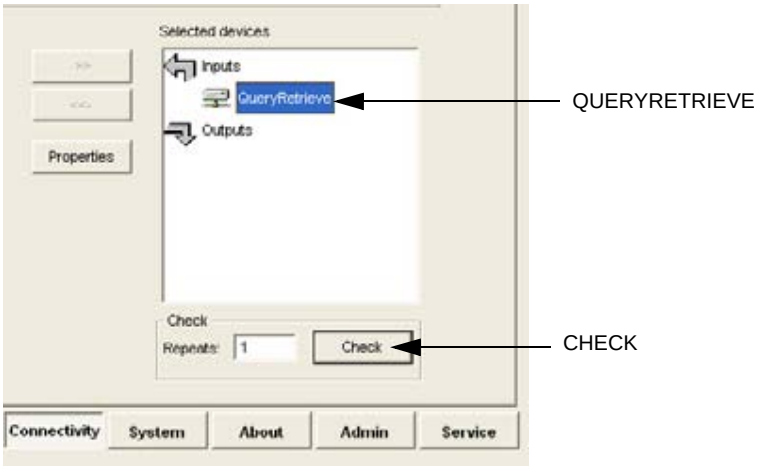


Figure 3-119 Check the DICOM Query/Retrieve Workflow

1.) Select **QueryRetrieve** from the Selected devices list.

2.) Select **Check**.

- If the test passes, a pop-up dialog is displayed, see left illustration in Figure 3-120 "Test (Check) Passed" on page 3-112.

  Select **OK** to continue. A green check mark to the left of the Selected devices indicates that the test passed successfully.

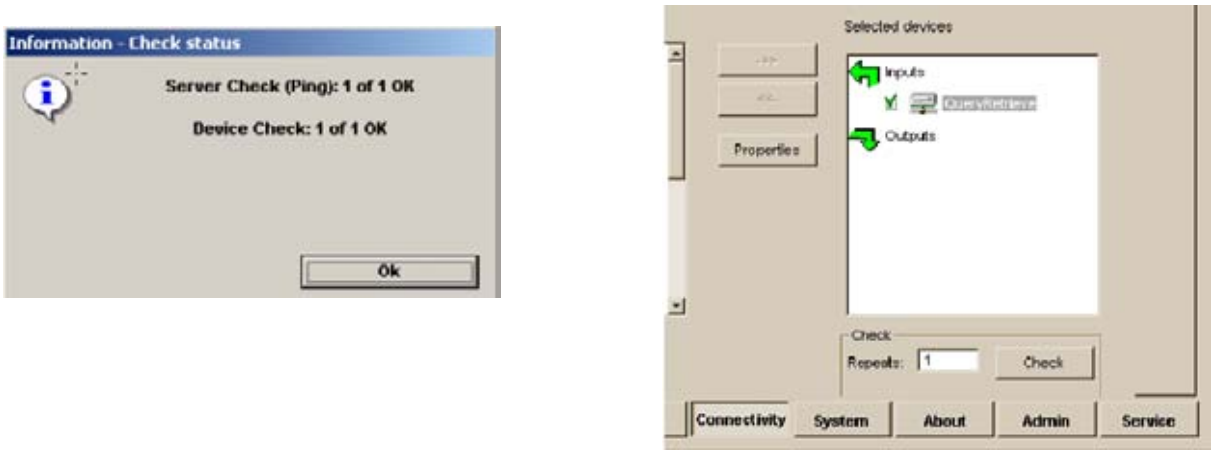


Figure 3-120 Test (Check) Passed

3-7-6 Query/Retrieve (Q/R) Setup (cont'd)

- If the test fails, a pop-up warning is displayed, see left illustration in Figure 3-121 "Test (Check) Failed" on page 3-113.

  Select **OK** to continue. A red "X" to the left of the Selected devices indicates that the test failed.

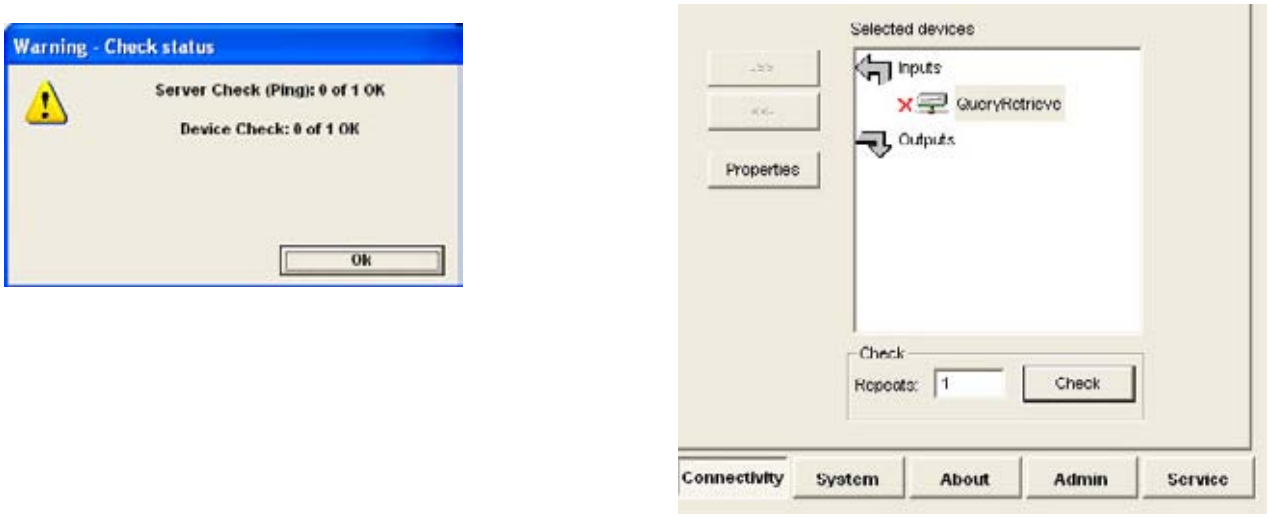


Figure 3-121 Test (Check) Failed

3-7-7 MPEGVue Export Configuration

NOTE: MPEGVue Player is intended for secondary review and patient consultation.

3-7-7-1 Introduction

The procedures below describe how to set up the Vivid S5 N or Vivid S6 N ultrasound scanner for MPEGVue export. This provides the user with the ability to export an entire patient exam into standard supported media (such as, CD, DVD, or USB Memory Stick [disk-on-key]) in standard MPEG or JPG format. The exported exam can later be read on any PC.

Media containing one or several patient exams in MPEGVue format is easily generated on the Vivid S5 N or Vivid S6 N. When exporting data from the system for this purpose, the exported examination contains files in HTML, MPEG and JPG formats for all of the images in the exam. It also contains measurements and reports generated and saved during the exam; the reports are all saved as files in .CHM format.

Any media generated as MPEGvue also contains an embedded MPEGVue viewer, allowing the user to view it on any PC without having to install any additional software.

The exported exam may be viewed on any PC operating on Windows 2000, 2003, Windows XP or Windows Vista. This can prove useful in many situations - for example, when sending patient data for a second opinion, for academic lectures, conferences, presentations, *etc*. Another way of using this feature is to directly provide the patient with an MPEGVue disk (CD or DVD) containing, for example, an OB exam.

3-7-7-2 Preparations

Obtain local IP addresses that will allow you to set up the system and the remote computer properly. This information is available from the local system administrator.

3-7-7-3 Configuring the Vivid S5 N or Vivid S6 N for MPEGVue Export

1) Press the **Config** (or **F2**) button and log on as *Adm*, as described in “Log On to the System as ADM” on page 10.

2.) Select **Connectivity**.

3.) Select **Dataflow**.

4) From the drop-down menu, select **Misc Export** - see Figure 3-122 "Dataflow - Misc Export" on page 3-114.

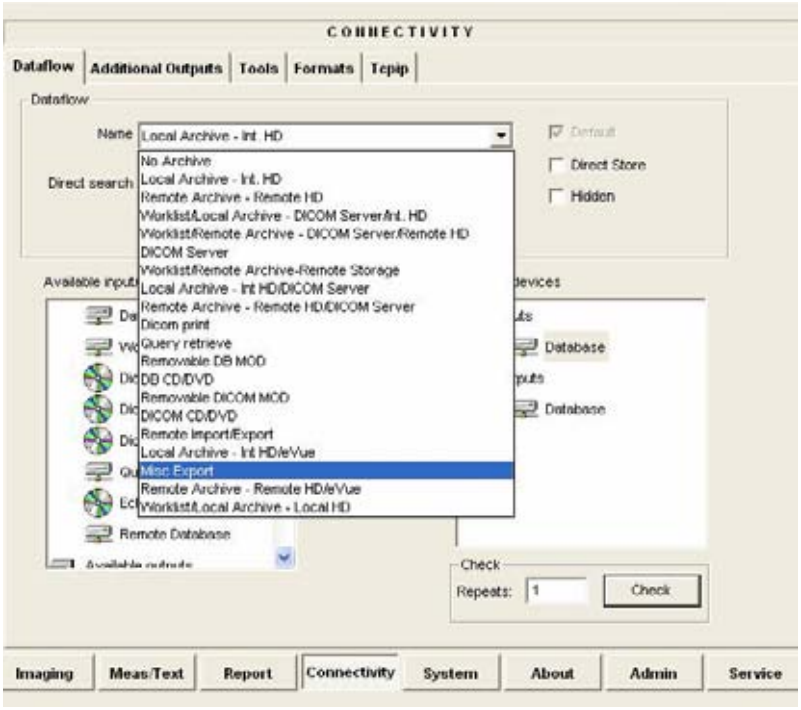


Figure 3-122 Dataflow - Misc Export

5) From selected output devices, highlight **evue** and then click the **Properties** button - refer to Figure 3-123 "eVue Properties" on page 3-115.

3-7-7-3 Configuring the Vivid S5 N or Vivid S6 N for MPEGVue Export (cont'd)

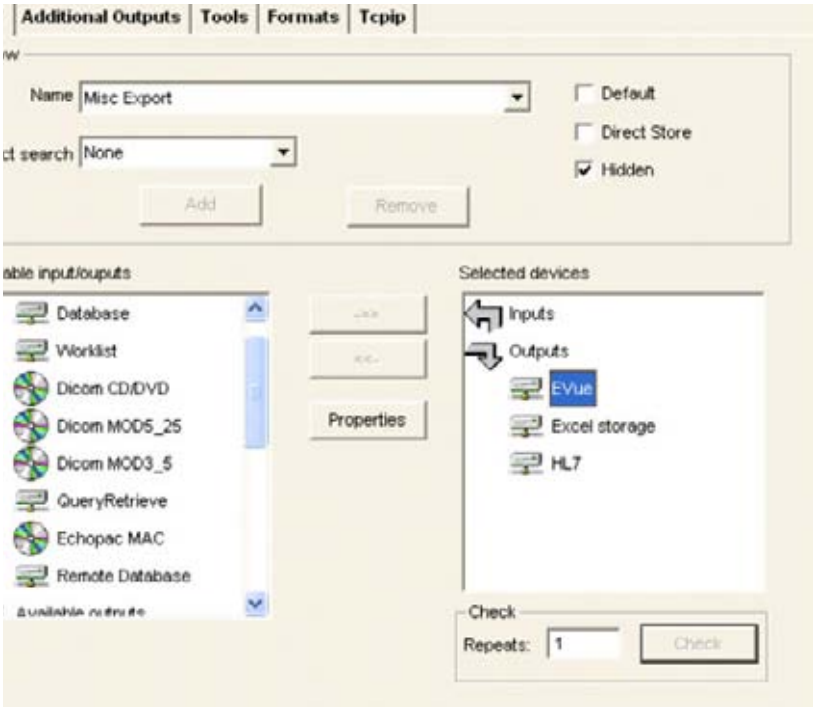


Figure 3-123 eVue Properties

The eVue Properties Dialog box opens:

Figure 3-124 eVue Properties Dialog Box

6) In the *Remote Path* field, type in the path to which you want to export MPEGVue (when this feature is used).

NOTE: If the destination is a constant IP, you can type either the remote computer name or the remote computer's ID address in the Remote Path field.
After the path has been typed, it is available for selection from the Dataflow Name drop-down menu (or you can select an existing path from this menu).

7) Activate the **Copy Media Player Installation** check box.

3-7-7-3 Configuring the Vivid S5 N or Vivid S6 N for MPEGVue Export (cont'd)

NOTE: Step 7 is recommended for the first transfer of MPEGVue files. This step is not needed for Windows XP nor for Windows Vista. After initial transfer of MPEGVue, it is recommended to disable this check box.

3-7-7-4 Exporting to MPEGVue

When exporting to MPEGVue, the Media can be one of the following supported types:

- CD
- MOD
- USB Memory stick (disk-on-key)

1.) Insert the required media into the appropriate drive (or USB port), when applicable.
2.) From the main screen, trackball to the **Patient** button and press **SET**.
3.) End the current exam (if still open), and select **Patient-List**.

The Patient List will be displayed with the following header:

Figure 3-125 Patient List Header

4.) Trackball to the **Export** softkey in the bottom menu shown below and press **SET**.

Figure 3-126 Export location

The Export dialog box opens.

Figure 3-127 Export Dialog Box

5.) Under Export *To*: select **To MPEGvue** in the combo-box on the right, as shown in Figure 3-127 "Export Dialog Box" on page 3-116.

3-7-7 MPEGVue Export Configuration (cont'd)

6.) Click **OK**.

The Patient List screen is displayed with the following header:

Figure 3-128 Patient List screen Export header

7.) Trackball to the required Patient File and select it by pressing **SET**.
To select more than one Patient File from list, use the <Shift> key together with **SET**

8.) When ready, after the required Patients Files have been selected (highlighted,) press the **COPY** button.

The selected files will be converted and copied into the selected media. When done, the following message is displayed:

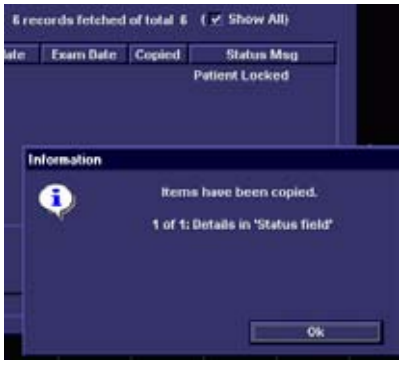


Figure 3-129 Information Dialog

9.) If required, click **OK** then select any additional Patient Files for export.

10.) When export complete, click **OK** then remove the media containing the exported MPEGVue data from the Vivid S5 N or Vivid S6 N system.

NOTE: If any problems occurred with copying the Patient Files during the export process, an error message such as the one below will be displayed, showing the status of each of the transferred Patient Files.

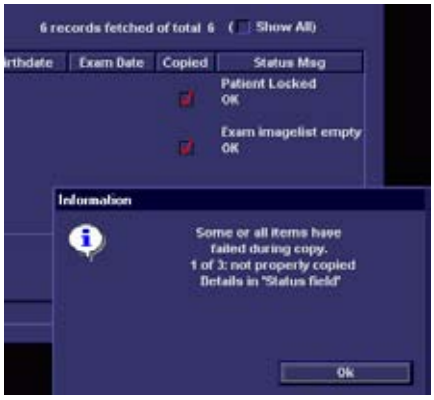


Figure 3-130 Next Information Dialog

3-7-8 eVue Dataflow Configuration

NOTE: MPEGVue Player is intended for secondary review and patient consultation.

3-7-8-1 Introduction

It is possible to configure the Vivid S5 N or Vivid S6 N ultrasound scanner to allow the user to send images or loops to a remote PC, in almost real time. When pressing Store, the loop will save not only to the local archive (in raw-data format), but will also be transmitted to a designated PC (“e-Vue PC”) on the network (in compact MPEG format), and will appear at the review PC within a very short time.

This feature proves very useful in the OR scenario, where consultation with another doctor in the hospital ***in real-time*** is required.

3-7-8-2 Preparations

Before configuring the Vivid S5 N or Vivid S6 N for eVue dataflow, it is necessary to decide upon a specific PC in the hospital as being the e-Vue PC station. The service technician then configures the Vivid S5 N or Vivid S6 N to send images to that specific e-Vue PC, as described below.

3-7-8-3 Configuring the Vivid S5 N or Vivid S6 N for eVue Dataflow

1.) Verify which PC in the hospital/institute has been designated as the e-Vue station.

2.) Make sure the Vivid S5 N or Vivid S6 N is connected to the Network via cable or wireless.

3.) On the Vivid S5 N or Vivid S6 N scanner, press the **Config** button.

The System Configuration window opens.

4.) Click **Connectivity**.

The Connectivity dialog box opens.

5.) Select the **Dataflow** Tab, as shown in Figure 3-131 "Connectivity - Dataflow Tab Selected" on page 3-119.

3-7-8 eVue Dataflow Configuration (cont'd)

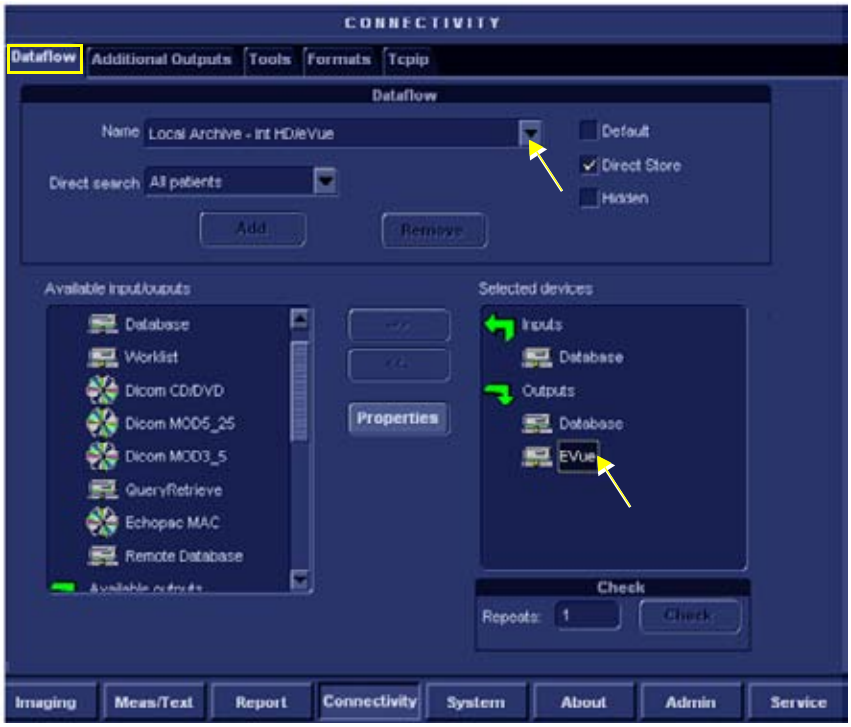


Figure 3-131 Connectivity - Dataflow Tab Selected

6.) Click on the **Name** field to access the drop-down menu.

7.) From drop-down menu, select the Dataflow named **Local Archive – Int. HD/eVue**.

8.) Trackball to the *Selected devices* window and select (highlight) **eVue** (see Figure 3-131 "Connectivity - Dataflow Tab Selected" on page 3-119).

9.) Trackball to the **Properties** button and press **SET**.

The eVue Properties dialog box opens.

Figure 3-132 eVue Properties Dialog Box

3-7-8 eVue Dataflow Configuration (cont'd)

10.) Trackball to the *Remote Path* field and type in the IP address and path of the remote computer: **\\10.0.0.2\EVUE_IMPORT**, or type in the remote computer full name **\\Name\EVUE_IMPORT** (refer to Figure 3-132 "eVue Properties Dialog Box" on page 3-119).

11.) Trackball to the *Destination* field, open the drop-down menu and select **Remote Path (\\10.0.0.2\EVUE_IMPORT)**, or the computer name **\\Name\EVUE_IMPORT** (refer to Figure 3-132 "eVue Properties Dialog Box" on page 3-119).

12.) Activate the **Copy Media Player Installation** check box.

NOTE: Step 12 is recommended for the first transfer of eVue files. This step is not needed for Windows XP. After initial transfer of eVue, it is recommended to disable this check box.

The Vivid S5 N or Vivid S6 N dataflow is set and ready for export/import of eVue files into a network computer.

From now on, whenever the Vivid S5 N or Vivid S6 N is used for scanning and the **Store** button is pressed, another person will be able to view the stored loop on the remote e-Vue PC (after a short transmission time).
When new loops arrive, the following message will be displayed at the bottom of the screen: "*New images have arrived - To view please refresh the screen using F5".*"

3-7-8-4 Using eVue

1.) On the Vivid S5 N or Vivid S6 N ultrasound scanner, in regular scanning mode, press **Patient**.

When the following window is displayed, select **Create New Patient**.

Figure 3-133 EVue

The Search/Create Patient dialog box opens.

3-7-8 eVue Dataflow Configuration (cont'd)

Figure 3-134 Search/Create Patient Dialog Box

2.) Type the patient's Last Name and ID in the appropriate fields (see Figure 3-134 "Search/Create Patient Dialog Box" on page 3-121).

3.) Select the Dataflow you intend to use for this patient's information (in this case, select **Local Archive – Int HD/eVue** as shown in Figure 3-134 "Search/Create Patient Dialog Box" on page 3-121).

4.) Using the soft key buttons, select NEW PATIENT

Figure 3-135 New Patient Location

5.) Now start scanning. Each image you would like to store press the STORE button.

A few seconds after the Store button is pressed, images will be transferred into the remote computer (which was previously set as the destination - refer to Figure 3-132 "eVue Properties Dialog Box" on page 3-119).

6.) To proceed, follow to the instructions as described for 3-7-9-3 "Using MPEGVue Viewer on a Remote PC" on page 3-139.

3-7-9 Using MPEGVue/eVue on a Remote PC

NOTE: MPEGVue Player is intended for secondary review and patient consultation.

3-7-9-1 Installing MPEGVue on a Remote PC

NOTE: MPGEGVue player is not compatible with Windows 98.

When a CD ROM containing MPEGvue exams is placed into a CD drive on a remote PC, it should self-boot within a few seconds and display the Patient List.

The first time this is done on the remote PC there will be a one-time operation where the MPEGvue program will self-install. If the remote PC operating system is Windows XP the installation is automatic and, when completed, the Patient List on the CD will be displayed.

In the event that the remote PC operating system is Windows 2000, the auto-installation will display one of the messages shown below (see Figure 3-136 "Download/Installation Message Examples #1" on page 3-122 and Figure 3-137 "Download/Installation Message Examples #2" on page 3-123), requesting the user to download and install some drivers.

The requested drivers may be downloaded from the Internet, or, if the CD was pre-configured, those drivers will be located on the MPEGvue CD itself.

In addition to the above, the installation program will test the configuration of the remote PC and will display a message if any component on the computer is not within the required specifications.

Your computer is not configured for MPEGvue...
You have to upgrade one or few standard components of Microsoft Windows that are missing in your configuration.
Please click one of the following links to download and install the Microsoft DirectX8.1 or later component.
If your Windows is Windows2000 - click to the following link to start download
Microsoft DirectX8.1 component --- For Windows2000
If this version is outdated - please download and install the most current version of DirectX available on Microsoft Web Site.
Your computer is not configured for MPEGvue...
You have to upgrade one or few standard components of Microsoft Windows that are missing in your configuration.
Please click the following link to download and install the Microsoft DirectX8.1 or later component.
Microsoft DirectX8.1 component --- For Windows2000
If this version is outdated - please download and install the most current version of DirectX available on Microsoft Web Site.

Figure 3-136 Download/Installation Message Examples #1

3-7-9 Using MPEGVue/eVue on a Remote PC (cont'd)

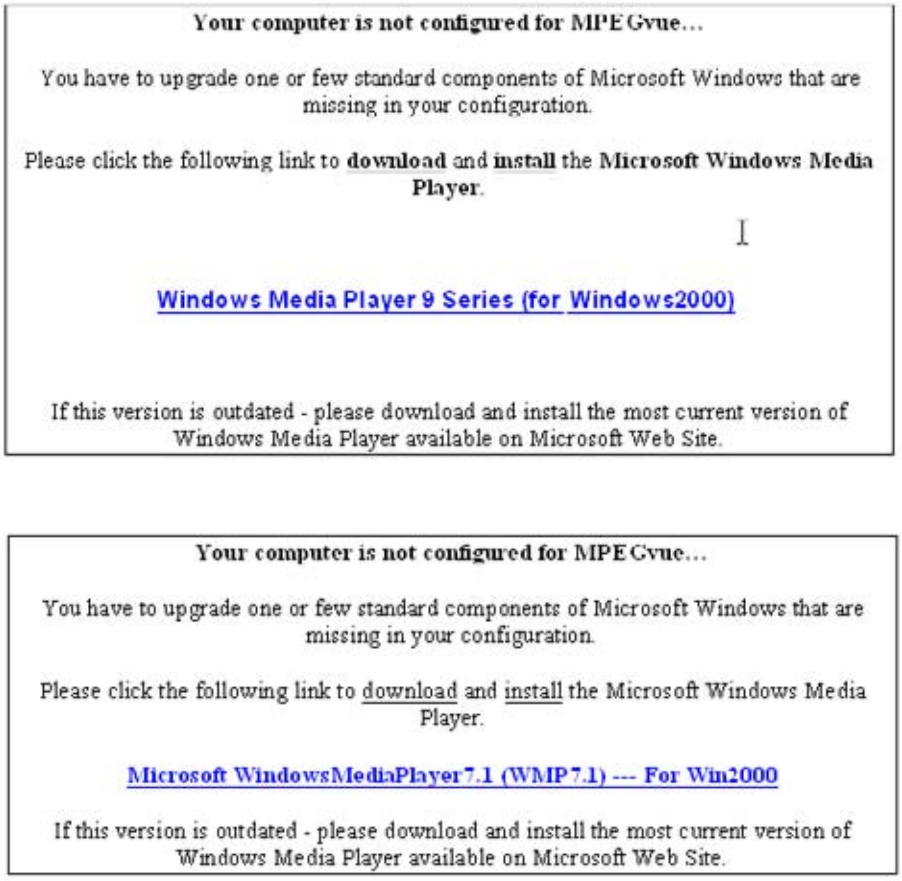

Your computer is not configured for MPEGvue...
You have to upgrade one or few standard components of Microsoft Windows that are missing in your configuration.
Please click the following link to download and install the Microsoft Windows Media Player.
Windows Media Player 9 Series (for Windows2000)
If this version is outdated - please download and install the most current version of Windows Media Player available on Microsoft Web Site.
Your computer is not configured for MPEGvue...
You have to upgrade one or few standard components of Microsoft Windows that are missing in your configuration.
Please click the following link to download and install the Microsoft Windows Media Player.
Microsoft WindowsMediaPlayer7.1 (WMP7.1) --- For Win2000
If this version is outdated - please download and install the most current version of Windows Media Player available on Microsoft Web Site.

Figure 3-137 Download/Installation Message Examples #2

3-7-9-1-1 Manually Setting the Network PC for eVue Import

1) On the network computer, create a New User by accessing the Control Panel, as follows:

   a.) Double-click on **My Computer** icon on desktop.

   b.) Double-click on **Control Pane**l icon.

2) Double-click on **User Accounts** icon.

   The User Accounts dialog box opens:

3-7-9 Using MPEGVue/eVue on a Remote PC (cont'd)

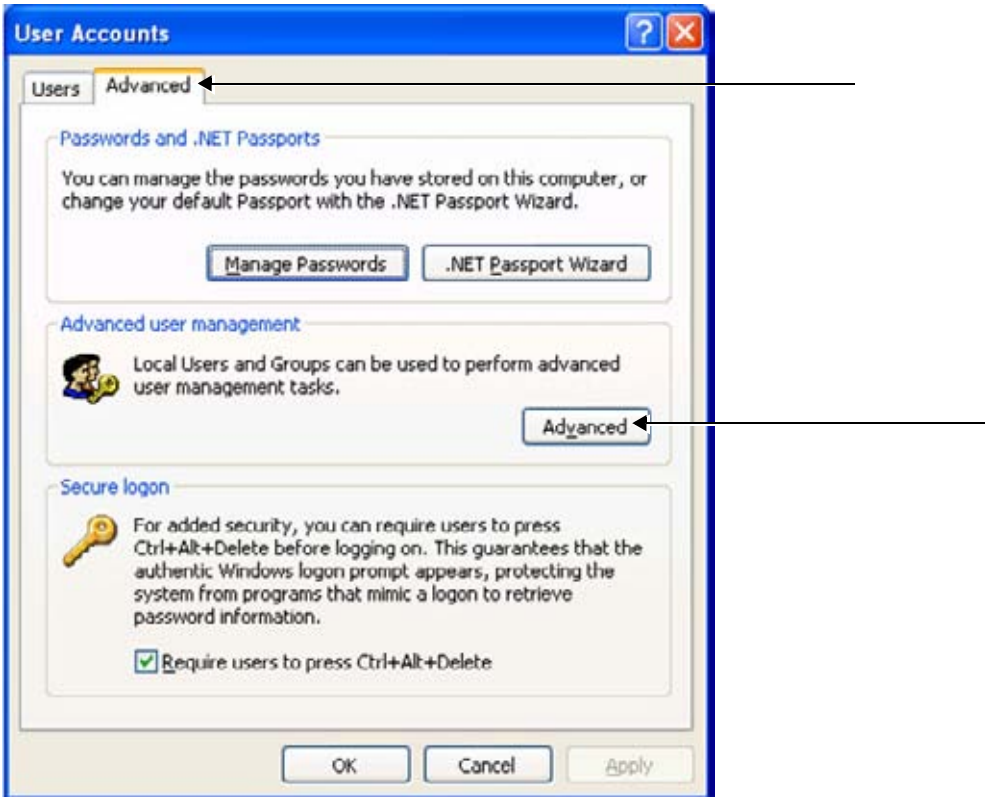

User Accounts
Users
Advanced
Passwords and .NET Passports
You can manage the passwords you have stored on this computer, or change your default Passport with the .NET Passport Wizard.
Manage Passwords
.NET Passport Wizard
Advanced user management
Local Users and Groups can be used to perform advanced user management tasks.
Advanced
Secure logon
For added security, you can require users to press Ctrl+Alt+Delete before logging on. This guarantees that the authentic Windows logon prompt appears, protecting the system from programs that mimic a logon to retrieve password information.
Require users to press Ctrl+Alt+Delete
OK
Cancel
Apply

Figure 3-138 User Accounts Dialog Box

3) Select the **Advanced Tab**.
4) Click on the **Advanced** button.

   The Local Users and Groups dialog box opens:

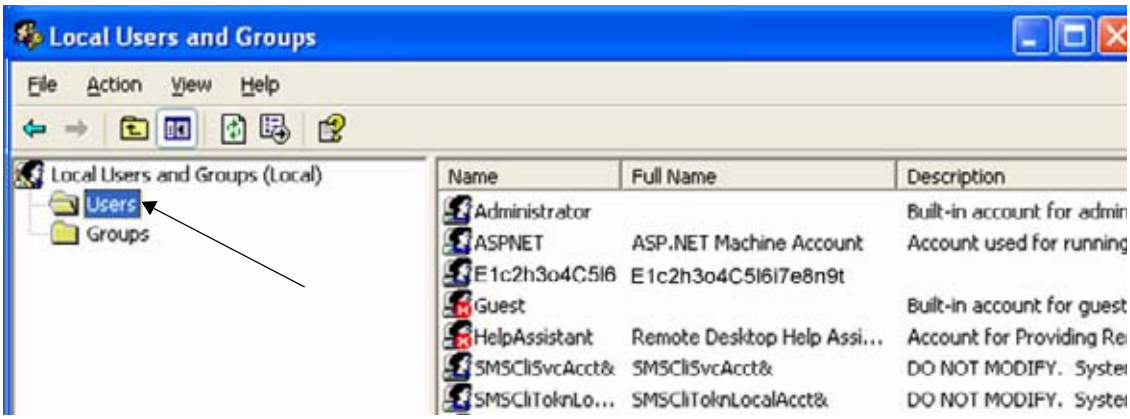


Figure 3-139 Local Users and Groups Dialog Box

5.) Select the **Users folder** and right-click to select **New User**.

3-7-9 Using MPEGVue/eVue on a Remote PC (cont'd)

The New User dialog box opens:

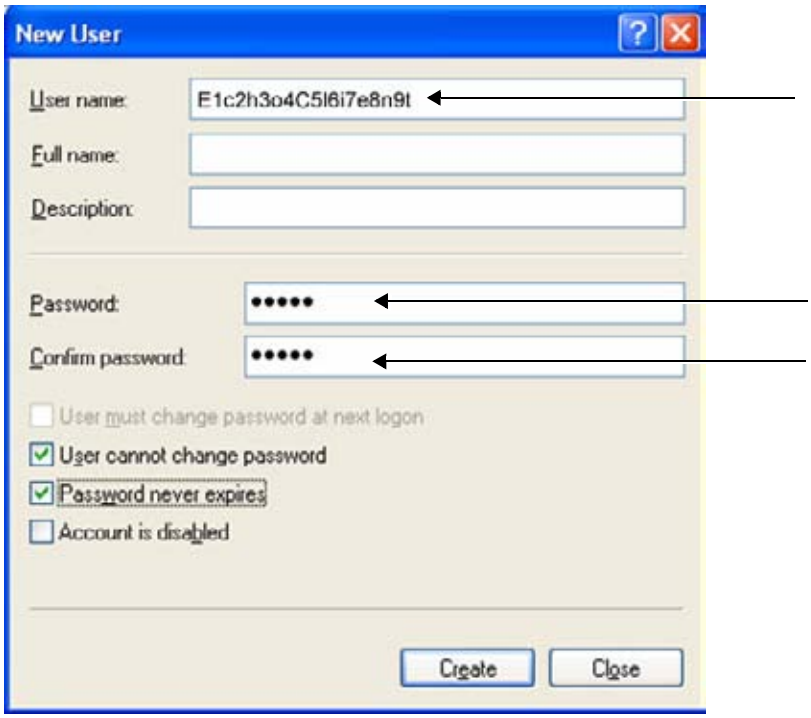


Figure 3-140 New User Dialog Box

6.) Configure a new user account, as follows (see Figure 3-140):

a.) User name: **E1c2h3o4C5l6i7e8n9t**

b.) Password: **u1l3t5r7a**

c.) Deactivate the *User must change password at next logon* check box.

d.) Activate both the **User cannot change password** and **Password never expires** check boxes.

e.) Click **Create** (to confirm setting), and **Close**.

f.) Close all windows.

The new user account has been set and is ready for activation.

Create a new folder for import/export and set sharing permissions, by proceeding as follows:

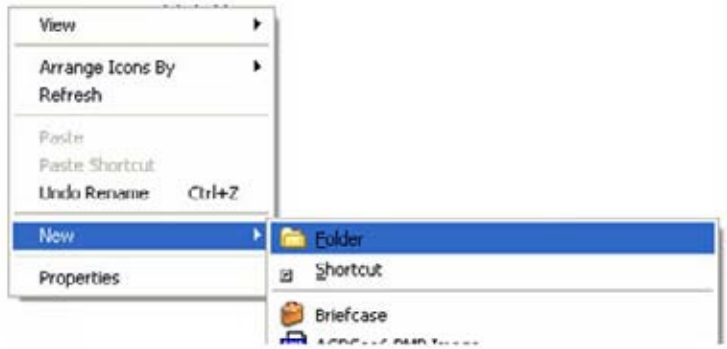
7.) On the network computer, double-click on the **My Computer** icon on the desktop.

8.) Under My Computer window select **any local drive** for retrieval of data and create a folder for sharing, as follows:

a.) Under the selected drive, place the cursor in an empty screen region and right-click the mouse.

b.) Now select **New** and **Folder**, to create a new folder:

3-7-9 Using MPEGVue/eVue on a Remote PC (cont'd)



Important: When more than one scanner is used to export with eVue, it is recommended to configure each scanner with its own folder for exporting files.

c.) Right-click on the New Folder icon and select **Rename**. Rename the folder as **eVue _Import**:

9.) Setting the Sharing properties for the new folder, as follows:

a.) Right-click on **eVue_Import** icon and select **Properties**;

The eVue_Import Properties dialog box opens, as shown in Figure 3-141 "eVue_Import Properties Dialog Box" on page 3-127.

3-7-9 Using MPEGVue/eVue on a Remote PC (cont'd)

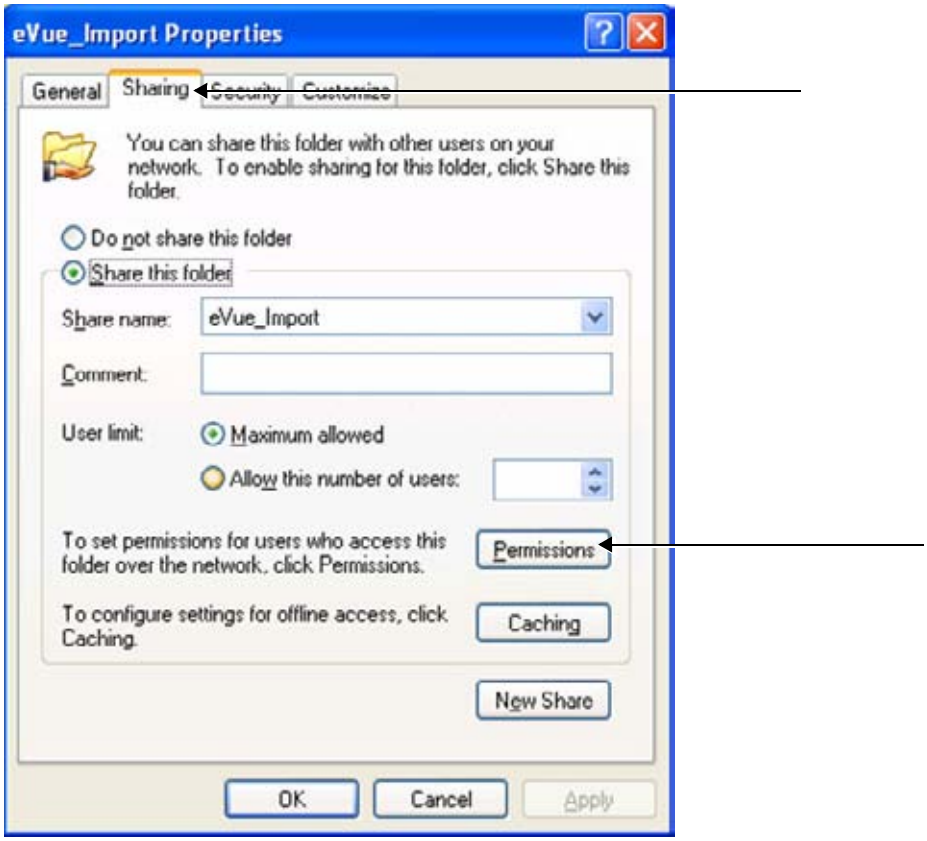


Figure 3-141 eVue_Import Properties Dialog Box

b.) Select the **Sharing Tab**.

c.) Click on the **Permissions** button.

The Permissions for eVue Import dialog box opens.

3-7-9 Using MPEGVue/eVue on a Remote PC (cont'd)

:

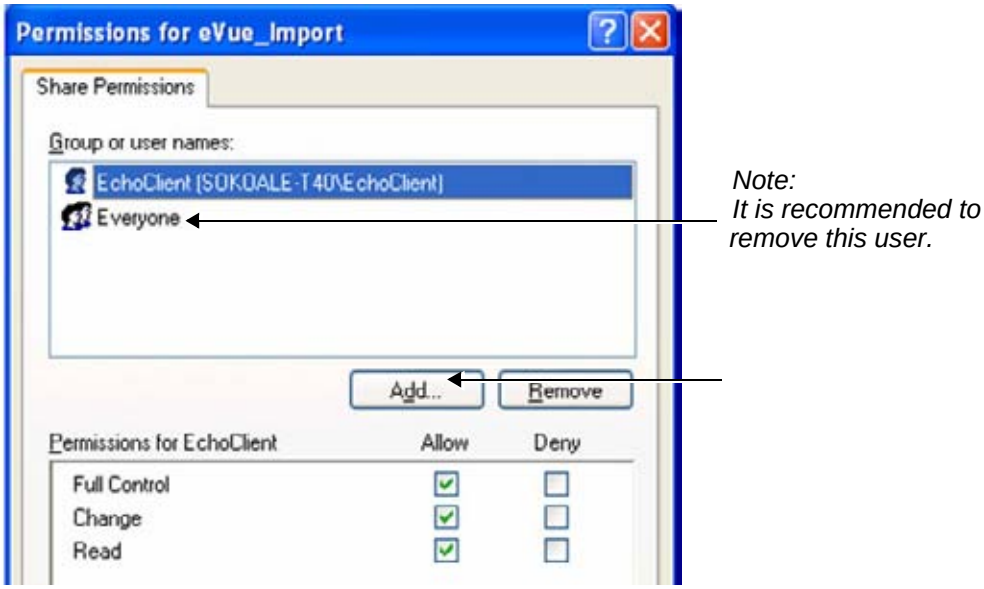


Figure 3-142 Permissions for eVue Import Dialog Box

d.) Click the **Add** button.

*NOTE: It is recommended to remove the User **Everyone** from Share Permissions.*

The Select Users, Computers, or Groups dialog box opens:

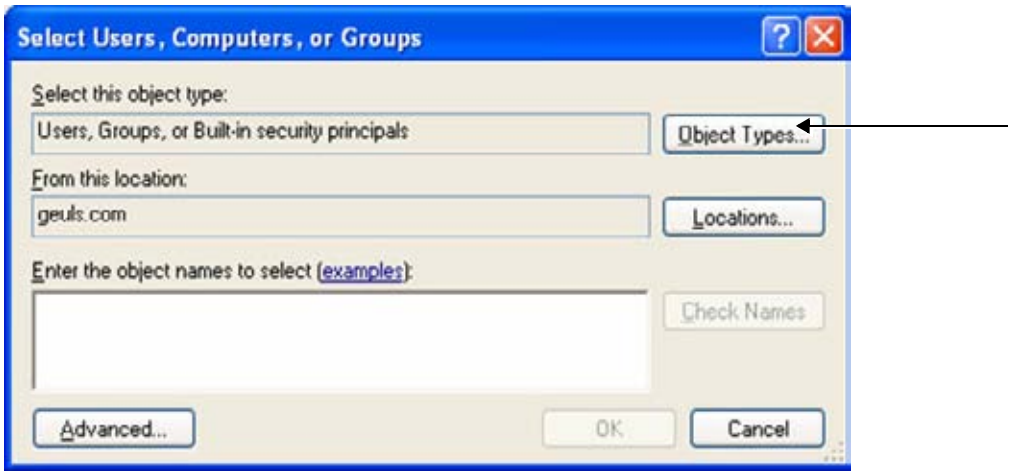


Figure 3-143 Select Users, Computers, or Groups Dialog Box

e.) Click the **Object Types** button.

f.) From the Object Types dialog box, select **all** to be active (activate all the check boxes, as shown below) and press **OK**.

3-7-9 Using MPEGVue/eVue on a Remote PC (cont'd)

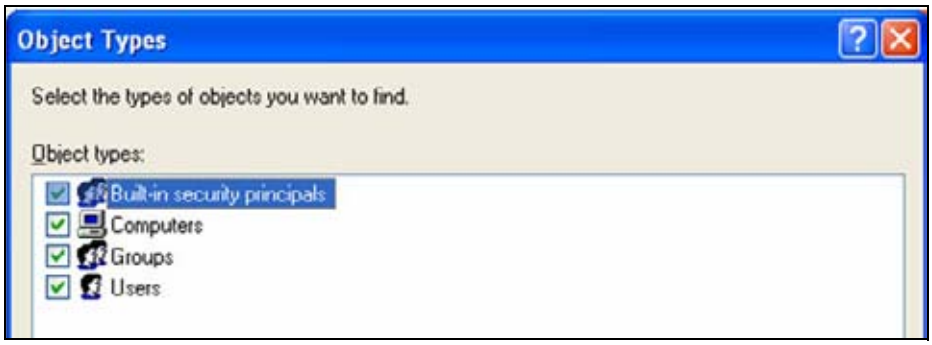


Figure 3-144 Object types overview

g.) From the Select Users, Computers, or Groups dialog box (Figure 3-143 "Select Users, Computers, or Groups Dialog Box" on page 3-128), click on the **Locations** button.

h.) In the Locations dialog box, select your **computer** from the list and press **OK**.

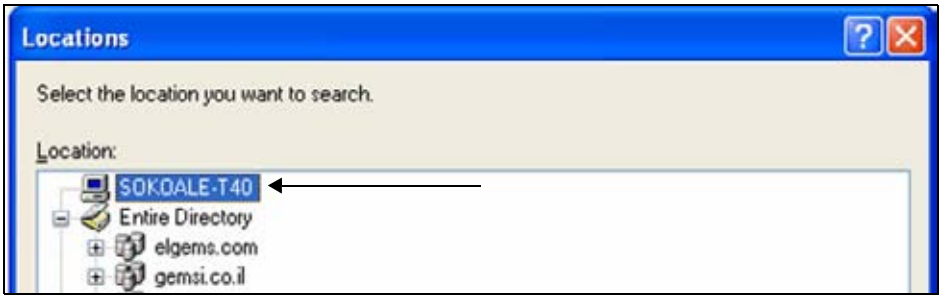


Figure 3-145 Locations overview

i.) In the Select Users or Groups dialog box, type **E1c2h3o4C5l6i7e8n9t** in the empty window, as shown in Figure 3-146 "Select Users or Groups Dialog Box - Check Names" on page 3-130.

3-7-9 Using MPEGVue/eVue on a Remote PC (cont'd)

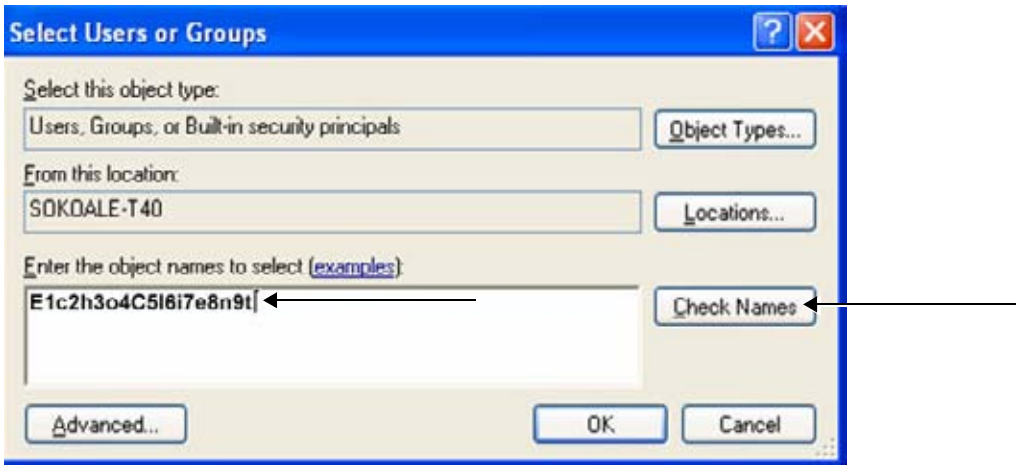


Figure 3-146 Select Users or Groups Dialog Box - Check Names

j.) Click the **Check Names** button.

The name and path will be detected by underlining, as shown below.

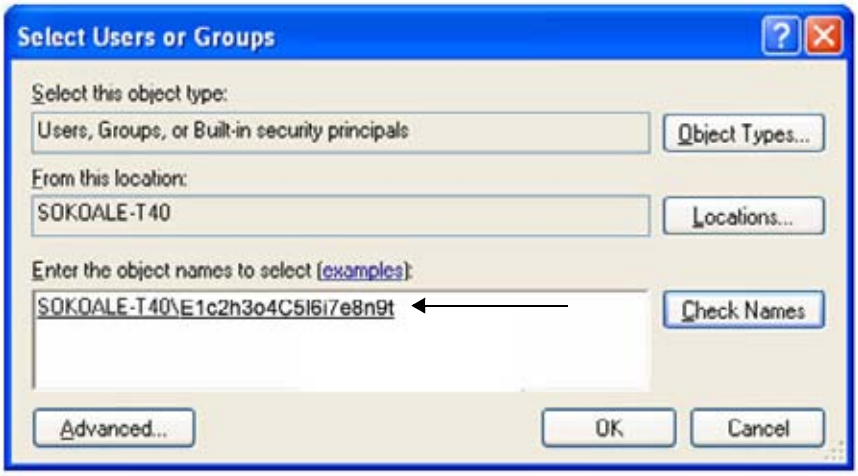


Figure 3-147 Select Users or groups overview Dialog

k.) Now click **OK**.

l.) From the Permission for eVue_Import dialog box, highlight and select **E1c2h3o4C5l6i7e8n9t** from the list (see Figure 3-148 "Setting Permissions for E1c2h3o4C5l6i7e8n9t" on page 3-131).

3-7-9 Using MPEGVue/eVue on a Remote PC (cont'd)

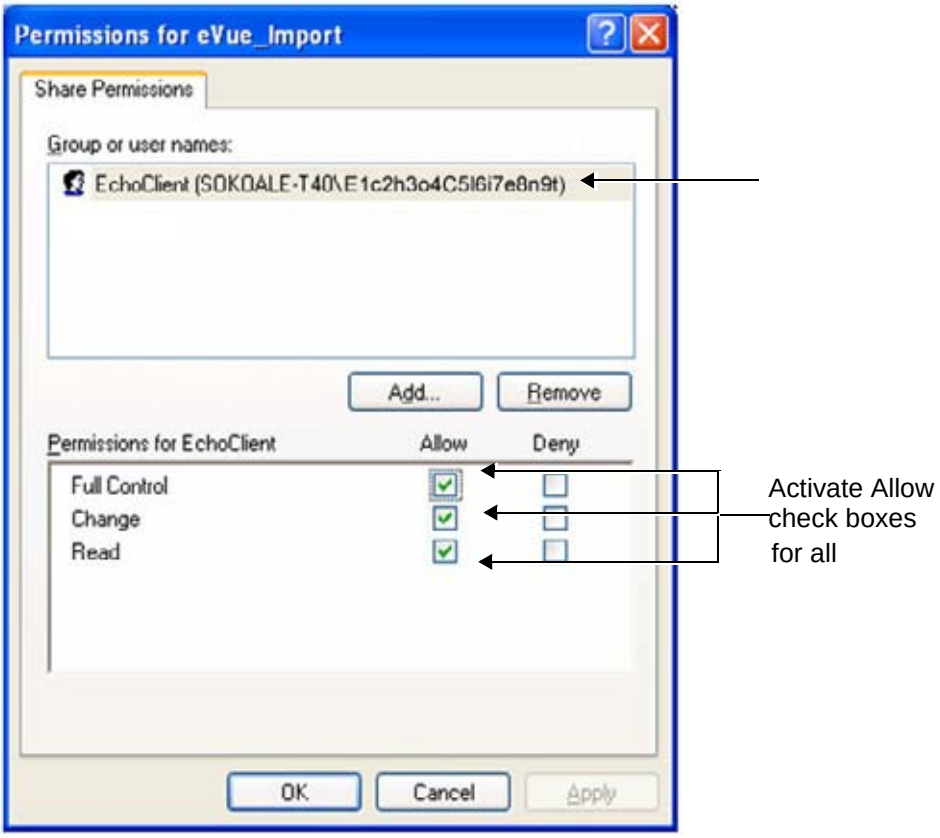


Figure 3-148 Setting Permissions for E1c2h3o4C5l6i7e8n9t

m.) Activate the *Allow* check boxes for all of the following: **Full Control**, **Change**, and **Read**.

n.) Click the **OK** button.

o.) **Close all** windows.

NOTE: The network computer is now ready to receive files from the Vivid S5 N or Vivid S6 N system. At this stage, set the appropriate path for export of files into the network computer. For example, for eVue, Data Flow or MpegVue export into the network computer using the browsing option to select the appropriate path. For an example of dataflow settings, refer to *Figure 3-131 "Connectivity - Dataflow Tab Selected" on page 3-119.*

3-7-9-1-2 Manually Stopping the Firewall on the Network PC

NOTE: In some cases, it is necessary to stop the firewall to allow functions such as Excel export and eVue to access and load files into the Network Computer. The Firewall can be an external service, or part of the Windows Basic Firewall tools.

Stopping the Windows Firewall

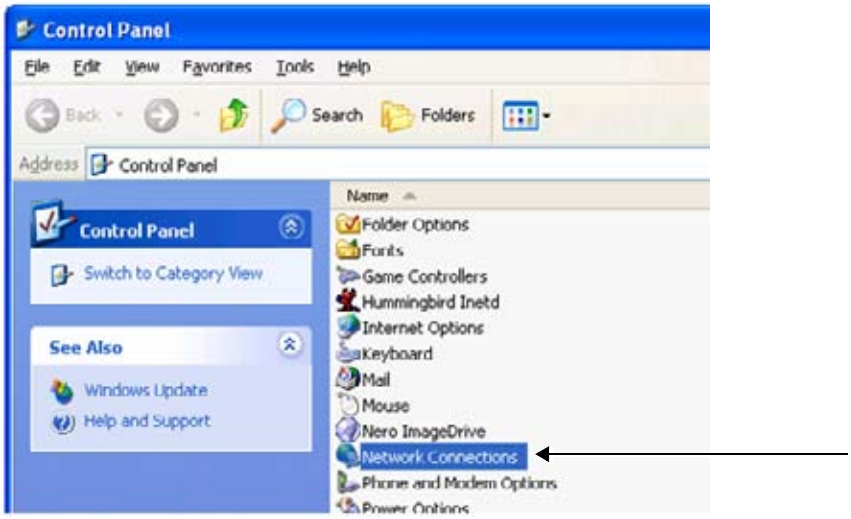
1.) On the network computer, access the **Control Panel**, as follows:

a.) Press **Start**.

b.) Select **Settings.**

3-7-9 Using MPEGVue/eVue on a Remote PC (cont'd)

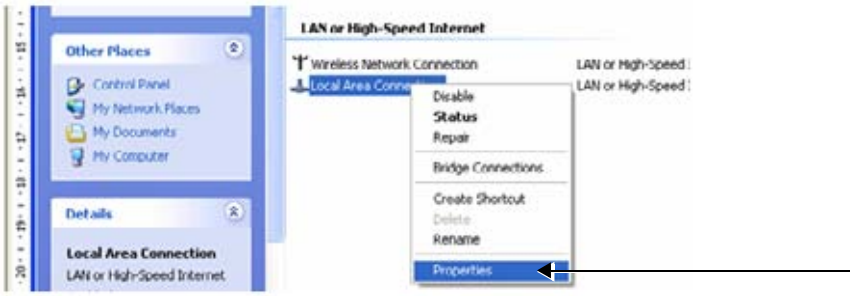
c.) Select **Control Panel** from the Menu.



2.) Double-click on **Network Connections** as shown above.

3.) Select your network connection and right-click.

4.) From the drop-down menu, select **Properties**.



3-7-9 Using MPEGVue/eVue on a Remote PC (cont'd)

The Local Area Connection Properties dialog box opens:

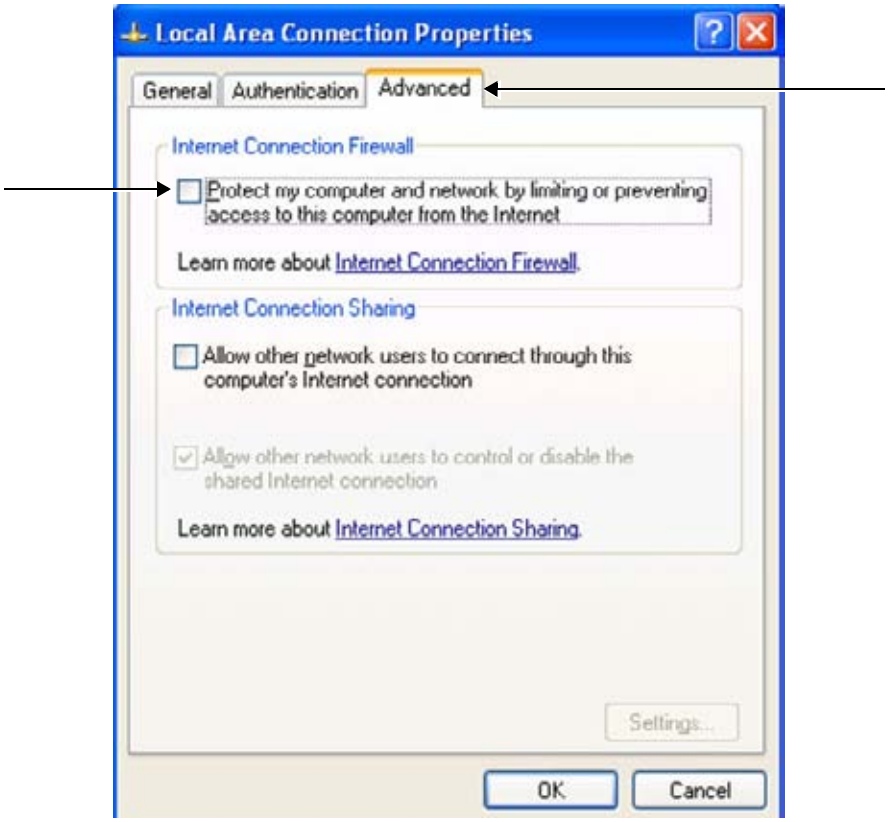

Local Area Connection Properties
General
Authentication
Advanced
Internet Connection Firewall
Protect my computer and network by limiting or preventing access to this computer from the Internet
Learn more about Internet Connection Firewall.
Internet Connection Sharing
Allow other network users to connect through this computer's Internet connection
Allow other network users to control or disable the shared Internet connection
Learn more about Internet Connection Sharing.
Settings...
OK
Cancel

Figure 3-149 Local Area Connection Properties Dialog Box

5.) Select the **Advanced** Tab.

6.) Uncheck the **Internet Connection Firewall** check box, as shown in Figure 3-149 "Local Area Connection Properties Dialog Box" on page 3-133.

7.) Click the **OK** button to confirm changes and close all windows.

Stopping an External Service Firewall

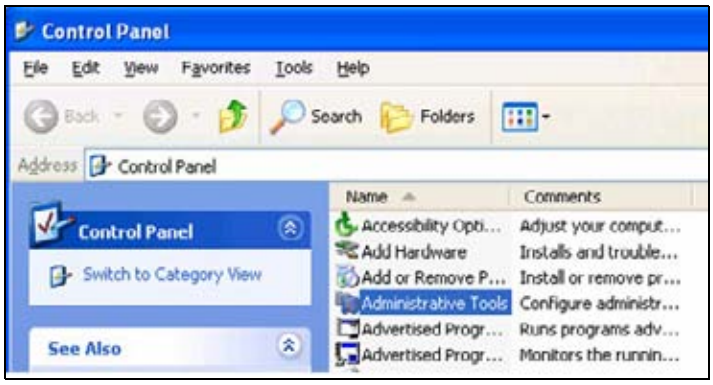
1.) On the network computer, access the **Control Panel**, as follows:

a.) Press **Start**.

b.) Select **Settings**

c.) Select **Control Panel** from the Menu

3-7-9 Using MPEGVue/eVue on a Remote PC (cont'd)



2.) Double-click on **Administrative Tools.**

The Administrative Tools dialog box opens:

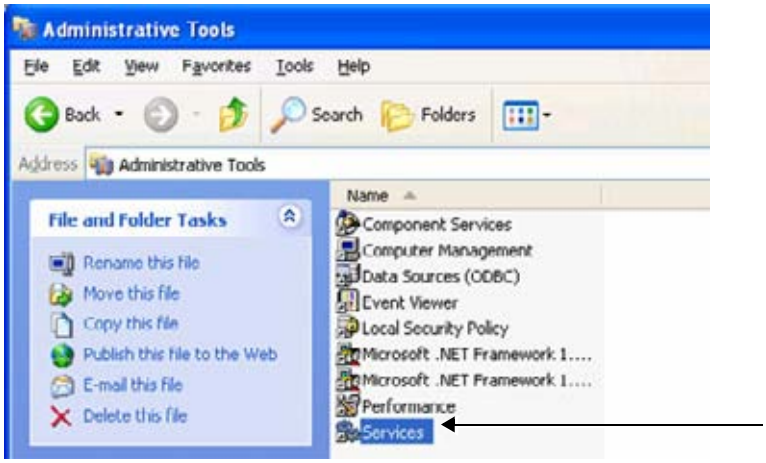


Figure 3-150 Administrative Tools Dialog Box

3.) Double-click on **Services**.

4.) From the Services dialog box, select your **firewall program** (for example, Black Ice).

3-7-9 Using MPEGVue/eVue on a Remote PC (cont'd)

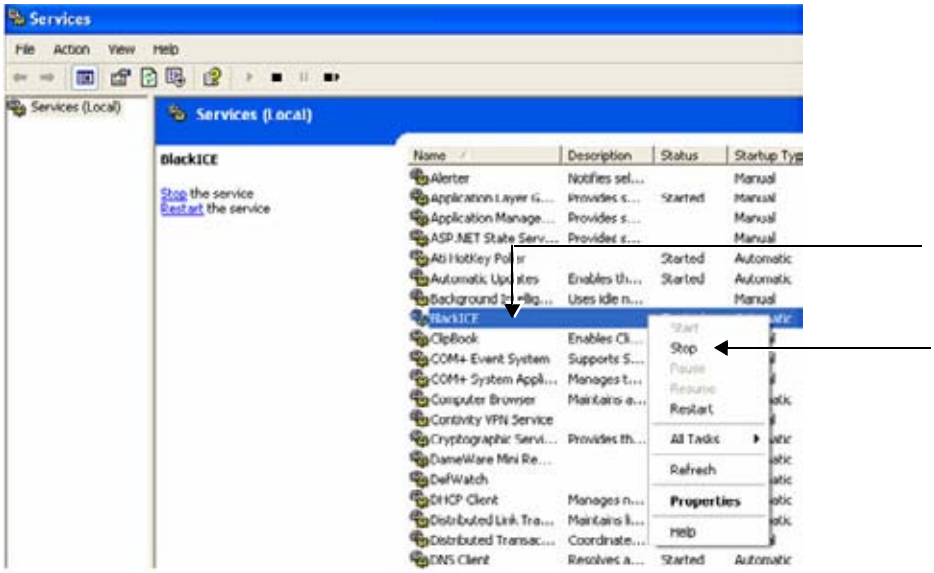


Figure 3-151 Services Dialog Box

5.) Right -click and select **Stop** from drop-down menu.

The following message will be displayed indicating that the Firewall is being stopped.

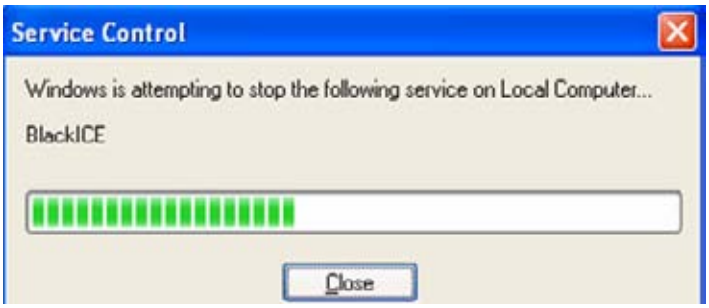


Figure 3-152 Stoppage progress

6.) When finished, click **Close**.

7.) Now you can try to reconnect the network computer to the Vivid S5 N or Vivid S6 N system.

Stopping the Firewall on Windows XP Service Pack 2

1.) On the network computer, access the **Control Panel**, as follows:

- a.) Press **Start**.
- b.) Select **Settings**
- c.) Select **Control Panel** from the Menu

2.) Double-click on **Windows Firewall.**

The Windows Firewall dialog box opens:

3-7-9 Using MPEGVue/eVue on a Remote PC (cont'd)

Windows Firewall
General
Exceptions
Advanced
Windows Firewall is helping to protect your PC
Windows Firewall helps protect your computer by preventing unauthorized users from gaining access to your computer through the Internet or a network.
On (recommended)
This setting blocks all outside sources from connecting to this computer, with the exception of those selected on the Exceptions tab.
Don't allow exceptions
Select this when you connect to public networks in less secure locations, such as airports. You will not be notified when Windows Firewall blocks programs. Selections on the Exceptions tab will be ignored.
Off (not recommended)
Avoid using this setting. Turning off Windows Firewall may make this computer more vulnerable to viruses and intruders.
Windows Firewall is using your domain settings.
What else should I know about Windows Firewall?
OK
Cancel

Figure 3-153 Windows Firewall Dialog Box

3.) Select the **General** Tab.

4.) Enable the **Off** check box (as shown in Figure 3-153 "Windows Firewall Dialog Box" on page 3-136).

5.) Press **OK**.

6.) Close all windows to return to the scanning screen.

3-7-9 Using MPEGVue/eVue on a Remote PC (cont'd)

3-7-9-2 Un-installing MPEGVue on a Remote PC

1.) Log in to Windows with **Administrator** permissions.

NOTE: You may need to obtain these from the local IT person.

2.) Close all Internet Explorer windows, if open.

3.) From the **C:\Program Files\GEULS\eStorePlayer\Version1_0** folder, double-click on the **UnRegisterAll.bat** icon, as shown in Figure 3-154 "Uninstall MPEGvue - Stage 1" on page 3-137.

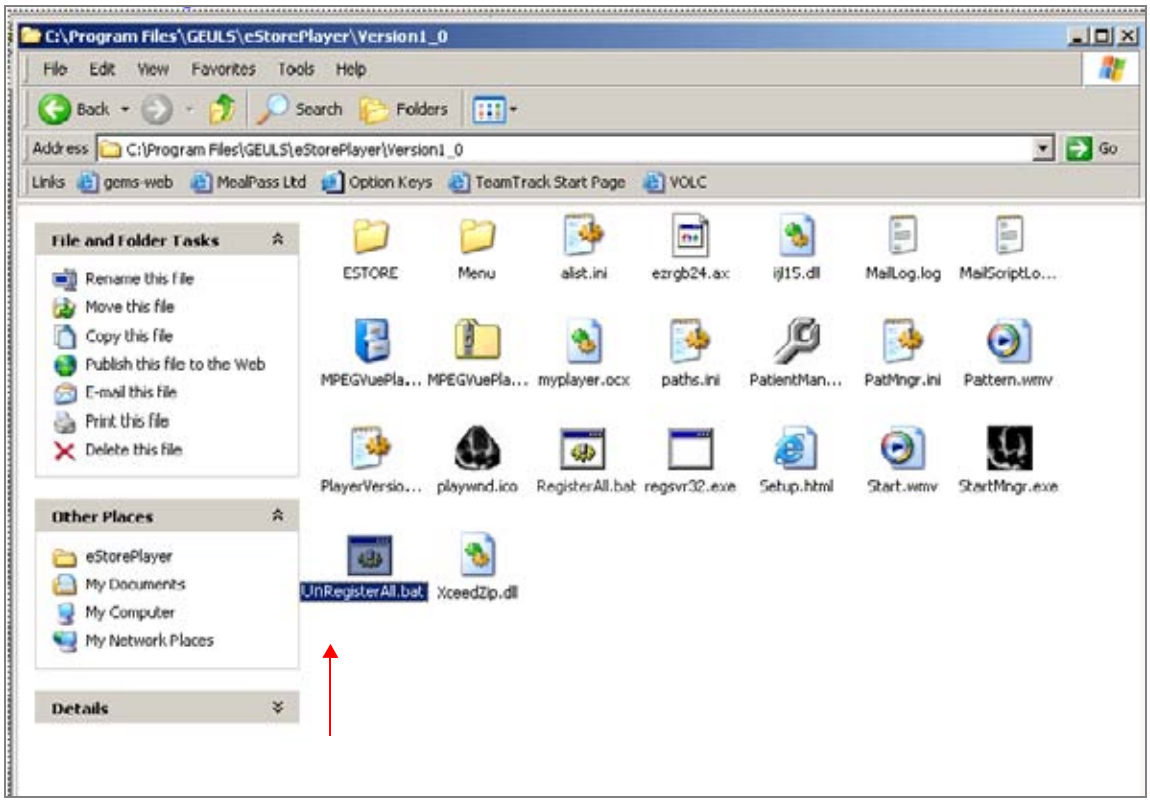


Figure 3-154 Uninstall MPEGvue - Stage 1

4.) If two messages are displayed one after another (shown in Figure 3-155 "Uninstall Message 1" on page 3-138 and Figure 3-156 "Uninstall Message 2" on page 3-138), click the **OK** button on each of them to close the message.

3-7-9 Using MPEGVue/eVue on a Remote PC (cont'd)

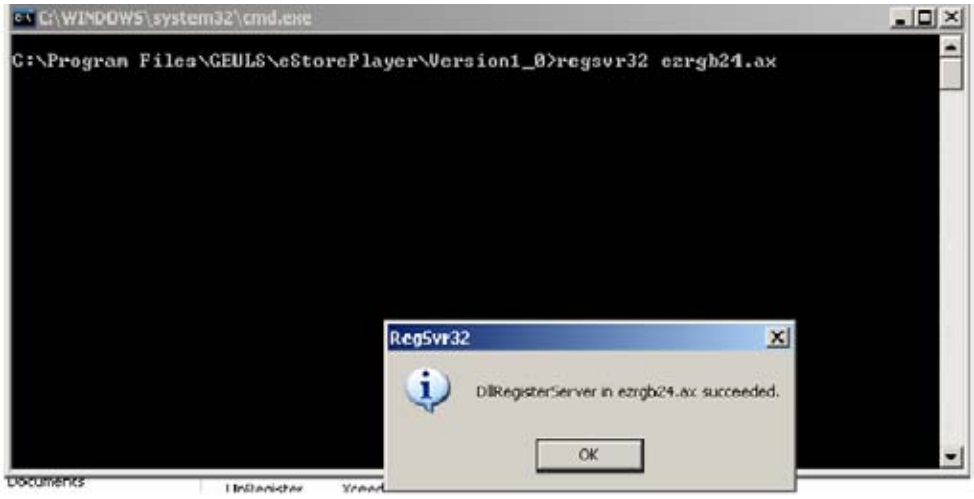


Figure 3-155 Uninstall Message 1

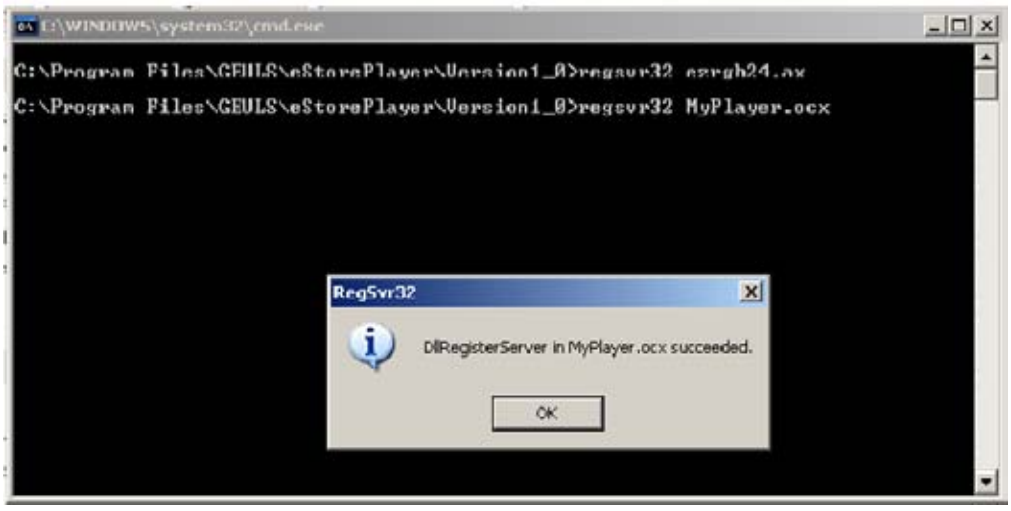


Figure 3-156 Uninstall Message 2

d.) From the **C:\Program Files\GEULS\eStorePlayer\Version1_0\ folder**, delete all files, as shown in Figure 3-157 "Deleting All Files" on page 3-139.

3-7-9 Using MPEGVue/eVue on a Remote PC (cont'd)

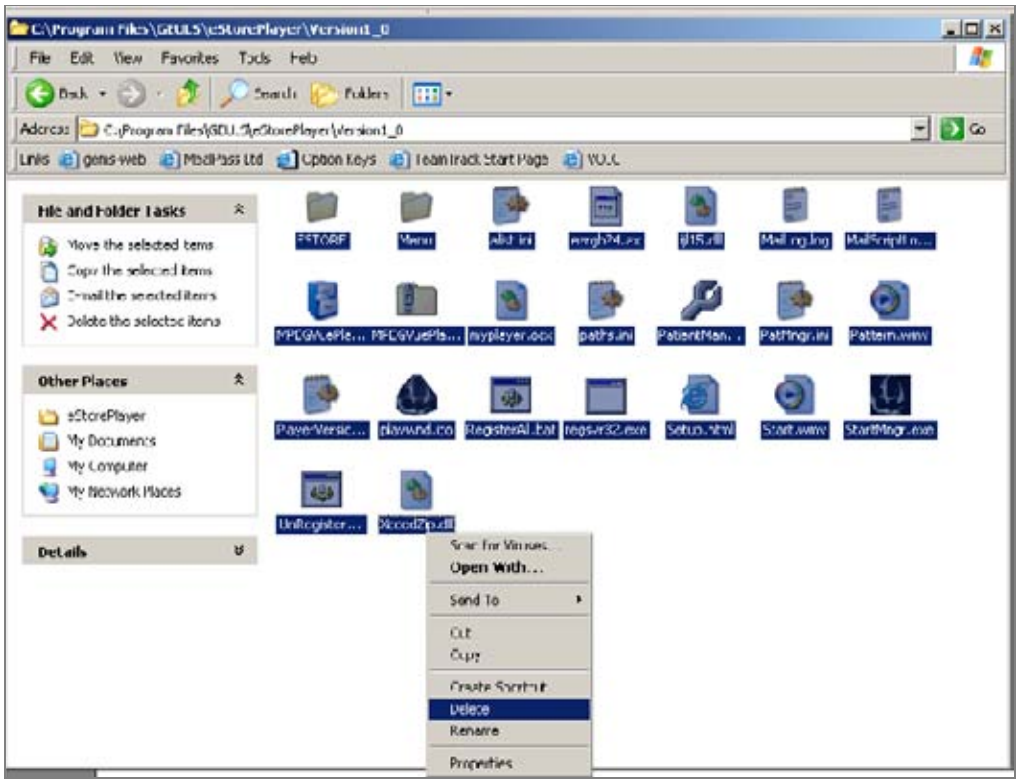


Figure 3-157 Deleting All Files

5.) Restart Windows, then confirm that the MPEGVue application is no longer installed.

3-7-9-3 Using MPEGVue Viewer on a Remote PC

3-7-9-3-1 Reading an MPEGVue Exam

An MPEG exam can be read on any computer with Windows 2000/XP/Vista, provided that DirectX 8.1 (or later) and Windows Media Player 7.1 (or later) are installed.

NOTE: DirectX 9 and Windows Media Player 9 are recommended.

In addition, the following requirements should be met:

- CPU speed: 900 MHz or faster
- RAM Memory: 128 MB or higher
- Screen resolution: 1024 x 768 pixels (recommended)
- Colors: 24 bit or higher
- The PC should be configured for Auto-play.

To read an MPEGVue exam stored on a CD, proceed as follows:

- Insert the MPEGVue CD in the computer CD drive.

3-7-9 Using MPEGVue/eVue on a Remote PC (cont'd)

The *MPEGVue Patient List* is displayed (see Figure 3-158 "MPEGVue Patient List" on page 3-140).

NOTE: In the event that the MPEGvue CD is being run for the first time, the program will self-install the MPEGvue viewer. For more details, refer to "Installing MPEGVue on a Remote PC" on page 122.

To read MPEGVue exams stored on other media:

1) Insert the media (MOD or Memory stick) containing the MPEGVue exams into the MOD drive (or USB port) on the remote computer.
2) Double-click on the file **START_MPEGVue.bat**.

   The *MPEGVue Patient List* is displayed (see Figure 3-158 "MPEGVue Patient List" on page 3-140).

3-7-9-3-2 MPEGVue Patient List

The MPEGvue player will always start by showing the Patient List contained in the inserted media (see the example below).

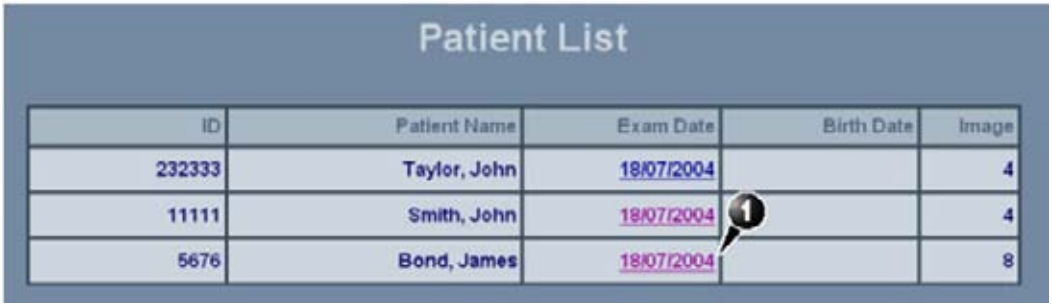
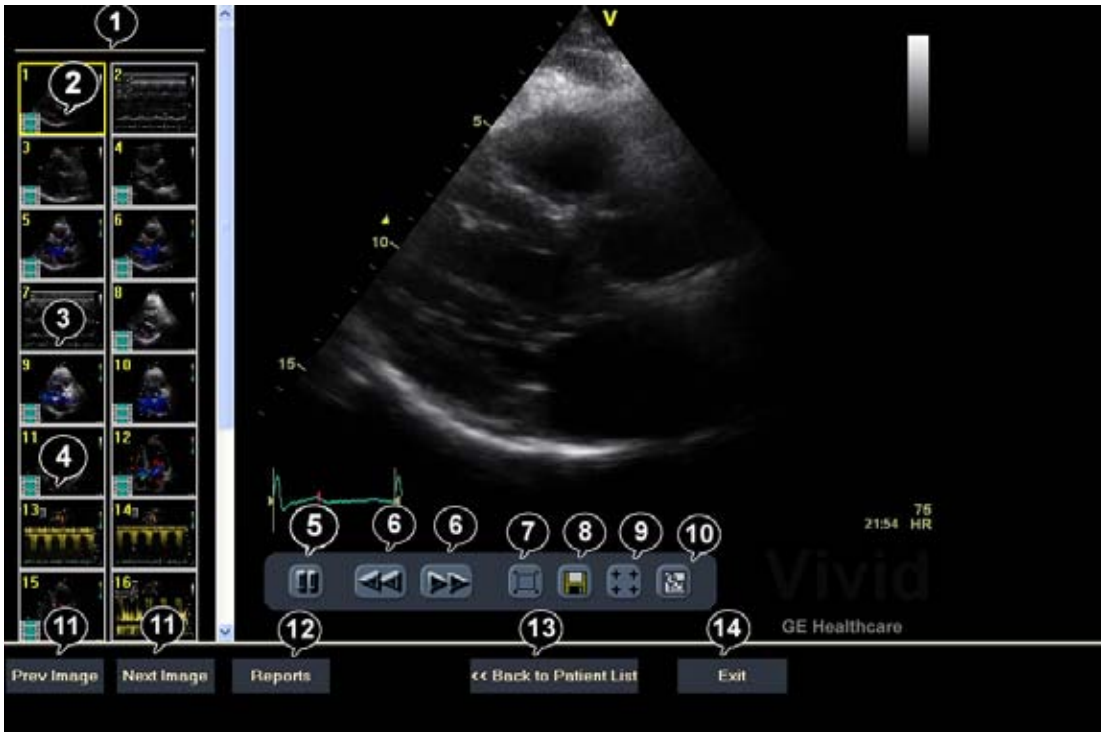


Figure 3-158 MPEGVue Patient List

1) Click on the required examination **Exam Date** (labelled 1 in the example above) to select and display images of that exam.

   The *MPEGVue screen* is displayed as shown in the example in Figure 3-159 "MPEGVue Screen" on page 3-141.

3-7-9 Using MPEGVue/eVue on a Remote PC (cont'd)



1.	Clipboard: select the image to display	8.	Save image as MPEG or Bitmap file
2.	Selected image	9.	Measurement tool
3.	Single frame image	10.	E-mail support
4.	Cineloop	11.	Display previous/next image
5.	Freeze/run cineloop	12.	Display reports (button appears only when report is available)
6.	Scrolling tool when in Freeze	13.	Display the MPEGVue Patient List
7.	Full Screen (press any key to return to normal view)	14.	Quit MPEGVue Screen

Figure 3-159 MPEGVue Screen

2) Proceed to use the navigation tools described below to select an image and perform the various review functions, as required.

3-7-9-3-3 Selecting an Image

When a thumbnail image is selected for review, the thumbnail image in the clipboard area becomes bounded (highlighted) with a yellow frame. This currently-selected image is also displayed in full size in the MPEGVue Screen view pane.

There are several ways to select a thumbnail image from the clipboard:

- Use the mouse pointer. With the pointer on the required image, click the *left* mouse button to select the image.
- Use the **up** or **down** keyboard arrow to view the *next* or *previous* loop in the exam.
- Click on the **Next Image** or **Previous Image** buttons (#11 in Figure 3-159 "MPEGVue Screen" on page 3-141), as required.

3-7-9 Using MPEGVue/eVue on a Remote PC (cont'd)

3-7-9-3-4 Stopping & Running the Cine-Loop

When a loop is selected, it appears on the screen in *Run-Mode*.

There are several ways to stop a loop and view it frame-by-frame:

- Clicking on the **Freeze/Run** icon (#5 in Figure 3-159 "MPEGVue Screen" on page 3-141) will *freeze* the loop. Clicking on same icon once again will run the loop again.
- Clicking on the **scrolling** icons (#6 in Figure 3-159 "MPEGVue Screen" on page 3-141) will *stop* the loop, allowing the user to advance *forwards* or *backwards* to the required frame.
- Using the **left / right** arrows - when the loop is in *Run-Mode*, pressing either the **left** or **right** arrows on the PC keyboard will *freeze* the loop. Further pressing the left or right arrows will *advance* the loop frame-by-frame.

3-7-9-3-5 Selecting a Different Patient

Click on the **Back to Patient List** button (#13 in Figure 3-159 "MPEGVue Screen" on page 3-141). On the Patient List, click on the **Exam Date** of the required patient.

3-7-9-3-6 Exporting Images or Loops from MPEGvue

Using the "Save As…" function, an image may be saved to any of the following file formats:

- .BMP
- .WMV (MPEG4)
- .JPEG

To save an image, click on the diskette icon (#8 in Figure 3-159 "MPEGVue Screen" on page 3-141). A *Save As…* dialog-box will appear, allowing you to select the desired file format in which to save the image.

3-7-9-3-7 Performing Measurements on MPEGVue Images

The following measurements can be performed on MPEGVue images:

- Distance and area in 2D images
- Height, time, and slope in M-mode images
- Velocity and time in Doppler modes

In a 2D image:

1) Select the **Measurement** tool (#9 in Figure 3-159 "MPEGVue Screen" on page 3-141).

   The distance measurement tool is automatically selected.

2) Perform the distance measurement.

3) To perform an area measurement, right-click on the image and select **Area**. Perform the area measurement.

In Other Modes:

1) Select the **Measurement** tool (#9 in Figure 3-159 "MPEGVue Screen" on page 3-141).

2) Perform the measurement.

NOTE: If the original image contains measurements that were taken and stored on the Vivid S5 N or Vivid S6 N scanner, those measurements will appear in the MPEGvue image. In this case, additional measurements cannot be performed on that image.

3-7-9 Using MPEGVue/eVue on a Remote PC (cont'd)

NOTE: Currently, the measurement function is not available on DICOM images/loops, any secondary captured screens 3D images, or images with discontinuities.

3-7-9-3-8 Saved Worksheets

On the Vivid S5 N or Vivid S6 N scanner, it is possible to view the Worksheet and press **Store**. This will generate a still frame showing a snapshot of the Worksheet with the visible measurements on it. This same snapshot will also be visible in the MPEGvue Viewer.

This feature allows users to archive some important measurements into the MPEGvue file.

3-7-9-3-9 Reports (.CHM files)

When Reports have been generated and saved on the Vivid S5 N or Vivid S6 N scanner, they will be exported, along with the rest of the MPEGvue exam to the remote PC where they can be reviewed as CHM files.

When an exam contains Reports, an additional button is displayed on the bottom of the MPEGvue Screen enabling the user to view the Reports of that exam.

3-7-9-3-10 Using MPEGVue over E-mail

NOTE: To use the MPEGVue over E-mail feature, Microsoft Outlook must be currently running. If not, the following message is displayed prompting the user to first logon to Outlook:

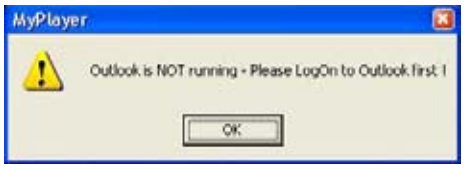


Figure 3-160 Information Dialog

It is possible to send images, loops, or full exams from any eVue PC. An eVue PC is a PC which contains the MPEGvue player and an e-mail client application (e.g. Microsoft Outlook).

The currently-selected image, or the entire examination, can be sent by e-mail as an attachment to one or several regular e-mail messages. Refer to "Sending a Full Examination by E-mail" on page 3-143 below, or "Sending an image by E-mail" on page 146, as applicable.
The recipient PC of those e-mail messages (where the eVue viewer is installed), will receive the exams and will integrate them into its Patient List, for easy review.

Sending a Full Examination by E-mail

NOTE: If this is the first time your recipient is receiving MPEGVue images, it is necessary to attach the MPEGVue Player - refer to the instructions for "Sending the MPEGVue Player Software by E-mail" on page 147.

1) From the MPEGVue Screen, open the examination to be sent and click the **E-mail** button (#10 in Figure 3-159 "MPEGVue Screen" on page 3-141).

   The *E-mail Dialog* box is displayed (see Figure 3-161 "E-mail Dialog Box - Sending Current Exam" on page 3-144).

2) Activate the **Send Current Exam** radio button (and if necessary, the **Attach Player Software** check box), as shown in Figure 3-161 "E-mail Dialog Box - Sending Current Exam" on page 3-144.

3-7-9 Using MPEGVue/eVue on a Remote PC (cont'd)

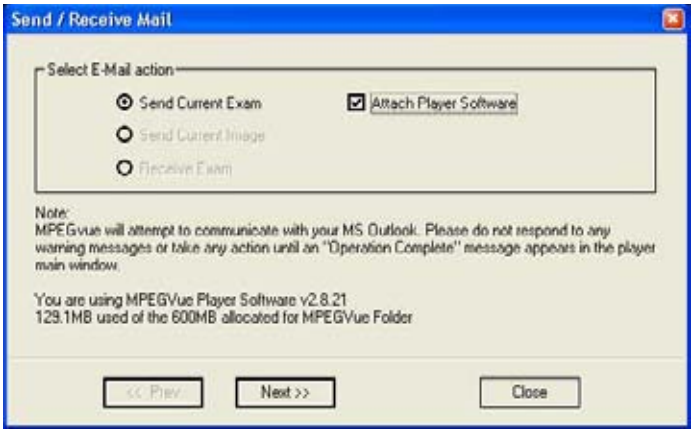

Send / Receive Mail
Select E-Mail action
Send Current Exam
Attach Player Software
Send Current Image
Receive Exam
Note:
MPEGvue will attempt to communicate with your MS Outlook. Please do not respond to any warning messages or take any action until an "Operation Complete" message appears in the player main window.
You are using MPEGVue Player Software v2.8.21
129.1MB used of the 600MB allocated for MPEGVue Folder
<< Prev
Next >>
Close

Figure 3-161 E-mail Dialog Box - Sending Current Exam

3.) Click **Next**.

The *E-mail address window* is displayed (Figure 3-162 "E-mail Address Window" on page 3-144).

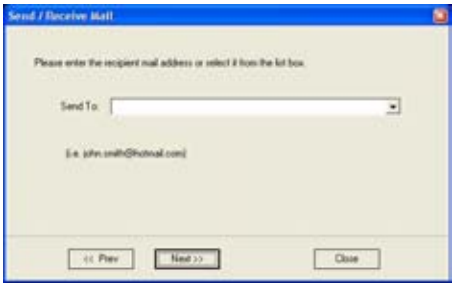


Figure 3-162 E-mail Address Window

4) Select an existing recipient address from the drop-down menu, or type a new address in the **Send To** field.

NOTE: Up to 10 addresses can be stored for future selection.

5) Click **Next**.

The user is prompted to enter a password (for encryption of the study) in the window displayed:

3-7-9 Using MPEGVue/eVue on a Remote PC (cont'd)

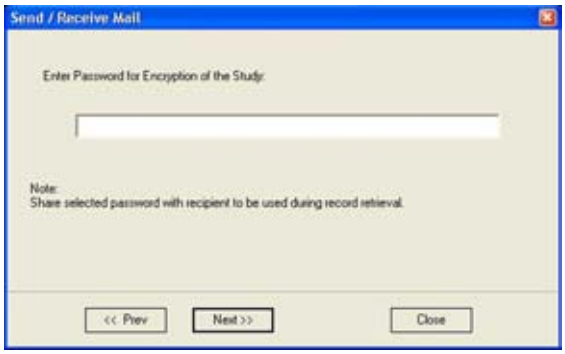

Send / Receive Mail
Enter Password for Encryption of the Study:
Note:
Share selected password with recipient to be used during record retrieval.
<< Prev
Next >>
Close

Figure 3-163 Enter Password Window

6) Type a unique password for the study.

NOTE: The password should be given to the recipient of the e-mail verbally by phone or by other protected means.
(It is recommended to keep a separate record of passwords used).

7) Click **Next**.

The E-mail (addressed to the selected addressee) with the full examination attached is sent to the Outbox; during this operation a series of progress windows are displayed, as seen in this example:

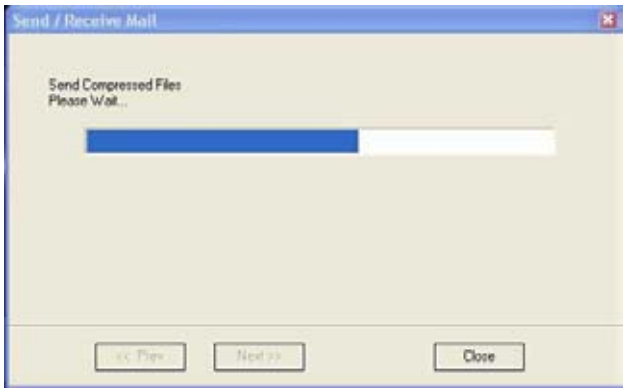


Figure 3-164 Sending Message to Outbox Progress Window

When the operation is complete, a *Confirmation window* is displayed as shown below

Operation Completed
Send operation completed successfully!
Please ensure delivery of Emails placed in the Outbox of your Outlook.
OK

Figure 3-165 Operation Completed Message

8) Click **OK** to close the message window.

9) Check that the e-mail message has been sent from the Outlook Outbox.

3-7-9 Using MPEGVue/eVue on a Remote PC (cont'd)

NOTE: Examinations sent by E-mail as attachments are compressed, encrypted, and password-protected. If the size of the exam is too large to be sent as a single attachment, it is divided into several zip file attachments sent with several independent E-mails, each less than 1Mbyte in size.

*The extension of the attached files is **.mpegvue** and can only be opened with the MPEGvue viewer.*

Sending an image by E-mail

NOTE: If this is the first time your recipient is receiving an MPEGVue image, it is necessary to attach the MPEGVue Player - refer to the instructions for "Sending the MPEGVue Player Software by E-mail" on page 147.

1) From the clipboard, select the image to be sent and click the **E-mail** button (#10 in Figure 3-159 "MPEGVue Screen" on page 3-141).

   The *E-mail Dialog* box is displayed.

Send / Receive Mail
Select E-Mail action
Send Current Exam
Send Player Software
Send Current Image
Receive Exam
Note:
MPEGvue will attempt to communicate with your MS Outlook. Please do not respond to any warning messages or take any action until an "Operation Complete" message appears in the player main window.
You are using MPEGVue Player Software v2.8.21
129.1MB used of the 600MB allocated for MPEGVue Folder
<< Prev
Next >>
Close

Figure 3-166 E-mail Dialog Box

2) Activate the **Send Current Image** radio button, then click **Next**.

NOTE: If it is necessary to send the MPEGVue Player software to the recipient, first complete this procedure, then proceed to "Sending the MPEGVue Player Software by E-mail" on page 147.

   The *E-mail address window* is displayed.

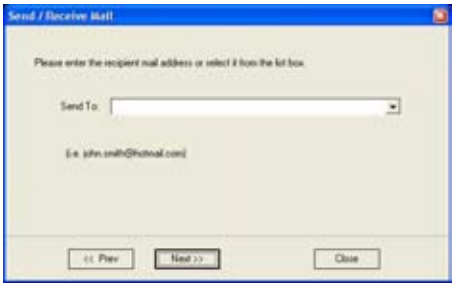


Figure 3-167 E-mail Address Window

3-7-9 Using MPEGVue/eVue on a Remote PC (cont'd)

3) Select an existing recipient address from the drop-down menu, or type a new address in the **Send To** field.

NOTE: Up to 10 addresses can be stored for future selection.

4) Click **Next**.

The E-mail (addressed to the selected addressee) with the image is sent to the Outbox; during this operation a progress window is displayed:

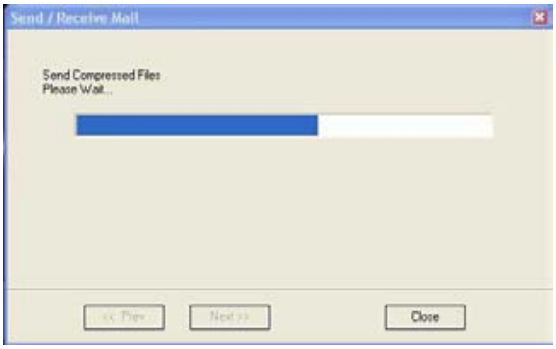


Figure 3-168 Sending Message to Outbox Progress Window

When the operation is complete, a *Confirmation window* is displayed as shown below.

Operation Completed
Send operation completed successfully!
Please ensure delivery of Emails placed in the Outbox of your Outlook.
OK

Figure 3-169 Operation Completed Message

5) Click **OK** to close the message window.

6) Check that the message has been sent from the Outlook Outbox.

When the message has been sent from the Outbox and received by the E-mail recipient, the image can now be opened in Windows Media Player.

Sending the MPEGVue Player Software by E-mail

NOTE: This procedure is required once - only the first time your recipient is receiving MPEGVue image/s.

1) From the *E-mail Dialog* box, activate the Send Player Software check box:

3-7-9 Using MPEGVue/eVue on a Remote PC (cont'd)

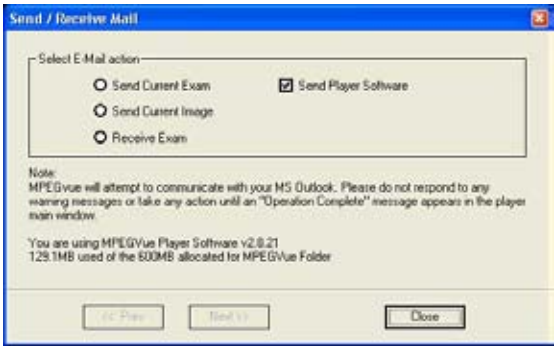

Send / Receive Mail
Select E-Mail action
Send Current Exam
Send Player Software
Send Current Image
Receive Exam
Note:
MPEGvue will attempt to communicate with your MS Outlook. Please do not respond to any warning messages or take any action until an "Operation Complete" message appears in the player main window.
You are using MPEGVue Player Software v2.0.21
129.1MB used of the 600MB allocated for MPEGVue Folder
Close

Figure 3-170 E-mail Dialog Box - Sending Player Software

2) Click **Next**.

3.) From the Email Address Window (Figure 3-167 "E-mail Address Window" on page 3-146), select the appropriate recipient address from the drop-down menu, or type the address in the **Send To** field.

4) Click **Next**.

The E-mail (addressed to the selected addressee) with the MPEGVue Player software is sent to the Outbox; during this operation a progress window is displayed (Figure 3-164 "Sending Message to Outbox Progress Window" on page 3-145).

When the operation is complete, a Confirmation window is displayed as shown in Figure 3-165 "Operation Completed Message" on page 3-145.

5) Click **OK** to close the message window.

6) Check that the message has been sent from the Outlook Outbox.

NOTE: When the message has been sent from the Outbox and has arrived at the addressee, the recipient should follow the instructions (included in the body of the email) in order to install the MPEGVue Player.

First Time Receipt of MPEGVue Player Software and Images by E-mail

When a group of messages arrive by e-mail and the user wishes to review the exam by MPEGvue, proceed as follows:

1) From Outlook, open the received email message containing the *installation of MPEGVue Player* files (three attachments: MPEGVuePlayer.cab; Start.wmv; Setup.html). Right-click on each attachment and select *Save As* to save them to the **Desktop**.

NOTE: Do not double-click on an attachment.

2) From the desktop, double-click on the

icon.

The *following message* is displayed:

3-7-9 Using MPEGVue/eVue on a Remote PC (cont'd)

Figure 3-171 Progress message

3) When prompted by the Warning message shown below, make sure all Internet Explorer windows are closed except the current window, then click **Yes** to proceed.

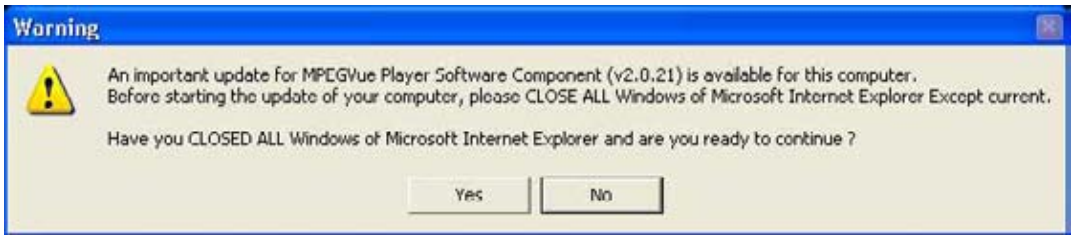

Warning
An important update for MPEGVue Player Software Component (v2.0.21) is available for this computer.
Before starting the update of your computer, please CLOSE ALL Windows of Microsoft Internet Explorer Except current.
Have you CLOSED ALL Windows of Microsoft Internet Explorer and are you ready to continue ?
Yes
No

Figure 3-172 Warning Message

When the installation of the MPEGVuePlayer software is complete, the MPEGVue Player Screen is displayed as shown in Figure 3-174 "Start MPEGVue Screen" on page 3-151.

NOTE: At this point, the MPEGVue startup icon is now displayed on the desktop, ready for future use. The user may choose to view the images immediately or later (as preferred). Follow the instructions described in "Get new exams by E-mail" on page 151.

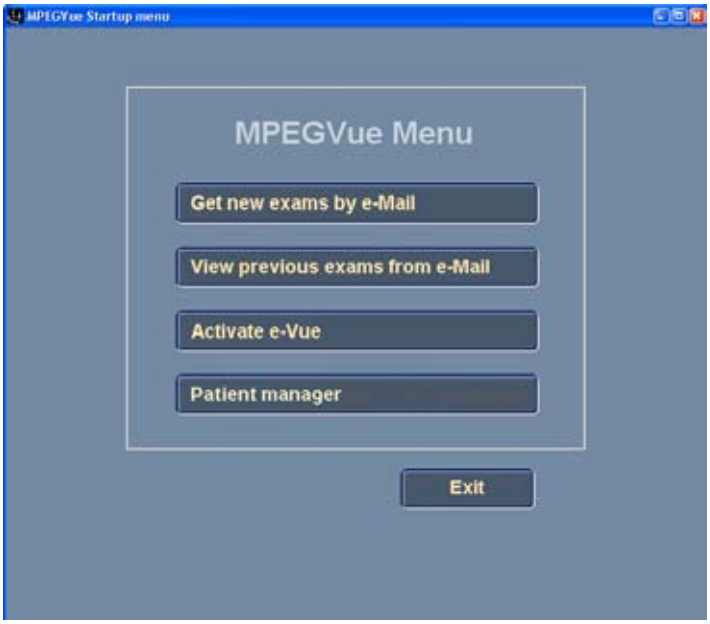
3-7-9-3-11 Managing and Viewing Exams Received

Once the MPEGVue Player software has been installed on a remote computer (as described in "First Time Receipt of MPEGVue Player Software and Images by E-mail" on page 148), the user is able to manage and review images or exams received via email, EXPORT OR REMOVABLE MEDIA?, using the MPEGVue utilities described below.

1) From the desktop, double-click on the MPEGVue Startup icon.

3-7-9 Using MPEGVue/eVue on a Remote PC (cont'd)

The MPEGVue Startup Menu opens:



1.	Provides access to Outlook Inbox
2.	Opens Patient List (lists only studies received by email)[a]
3.	Activates e-Vue - opens Patient List of studies received via export operation[a]
4.	Enables user to manage patient exams received by email, export or removable media (using copy, move or delete, as applicable)

Figure 3-173 MPEGVue Startup Menu

a. button is disabled until images or exams have been received

2) Proceed to use the required utility, as described in the procedures that follow.

3-7-9 Using MPEGVue/eVue on a Remote PC (cont'd)

3-7-9-3-12 Get new exams by E-mail

1) From the MPEGVue Startup Menu, click on the **Get new exams by email** button.

The Start MPEGVue screen is displayed, as shown in Figure 3-174 "Start MPEGVue Screen" on page 3-151.

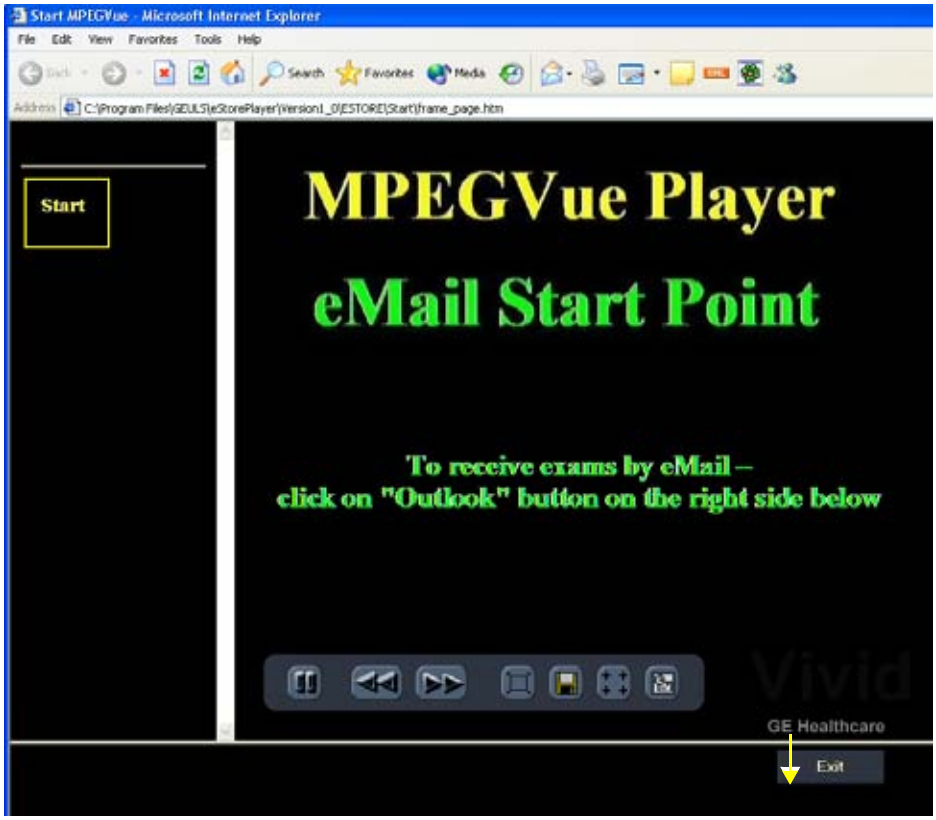

Start MPEGVue - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Start
MPEGVue Player
eMail Start Point
To receive exams by eMail –
click on "Outlook" button on the right side below
GE Healthcare
Exit

Figure 3-174 Start MPEGVue Screen

2) Click the Outlook **E-mail** button (shown in Figure 3-174 "Start MPEGVue Screen" on page 3-151).

The E-mail dialog box is displayed - refer to Figure 3-166 "E-mail Dialog Box" on page 3-146.

3.) Activate the **Receive Exam** radio button, then click **Next**.

The following message is displayed while the e-mail Inbox is being scanned for studies:

3-7-9 Using MPEGVue/eVue on a Remote PC (cont'd)

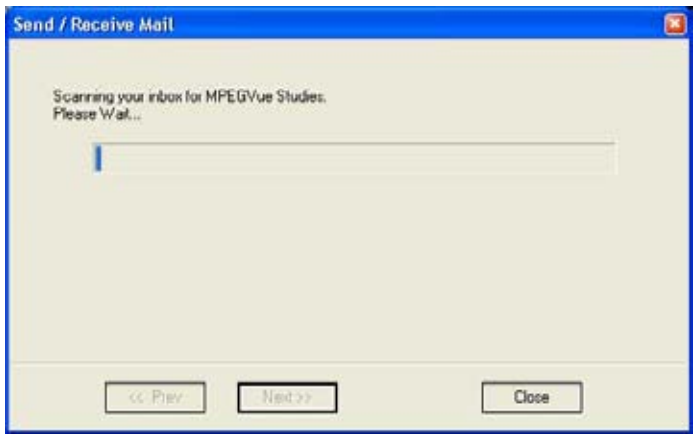


Figure 3-175 Send Progress dialog

When complete, all studies found in the Inbox are listed in the Found Studies dialog box, as shown in Figure 3-176 "List of Studies Found in Inbox" on page 3-152.

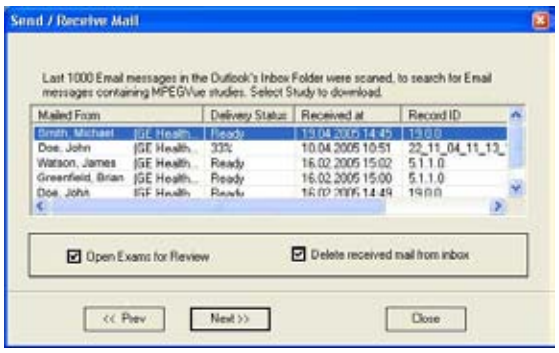


Figure 3-176 List of Studies Found in Inbox

4) Select the required Study from the list.

*NOTE: By default, the **Open Exams for Review** and **Delete Received Mail from Inbox** check boxes are activated.*

5.) Click **Next**.

The *Password window* is displayed:.

3-7-9 Using MPEGVue/eVue on a Remote PC (cont'd)

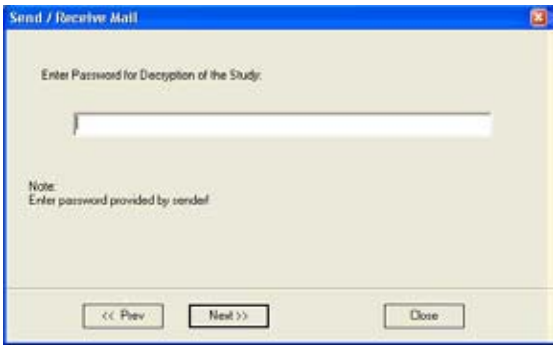


Figure 3-177 Password Window

6) Enter the same password (for decryption of the study) as that used by the sender of the e-mails.

NOTE: The Password is case-sensitive. In the event that an incorrect password is typed, the user is prompted with a warning message, as shown here.
*Click **OK** and enter the correct password.*

Figure 3-178 Warning message

7) Click **Next**.

The message *Receiving Selected Messages* is displayed, followed by another message (see Figure 3-179 "Message Showing Exams being Deleted from Inbox" on page 3-154) showing progress of deletion of messages from the Inbox.

3-7-9 Using MPEGVue/eVue on a Remote PC (cont'd)

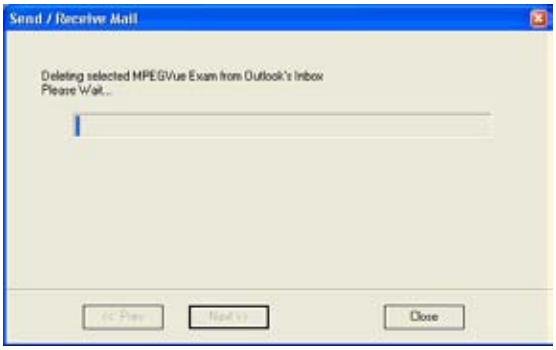


Figure 3-179 Message Showing Exams being Deleted from Inbox

The E-mail message(s) containing the MPEG examination is deleted from "In-box" of Outlook and is moved to the "Deleted-items" box of Outlook. When done, the following message is displayed:

Figure 3-180 Progress Dialog

8) Click **OK** to close the message.

The exam is now listed in the MPEGVue Patient List (see Figure 3-181 "MPEGVue Patient List" on page 3-154) and is ready for selection and viewing.

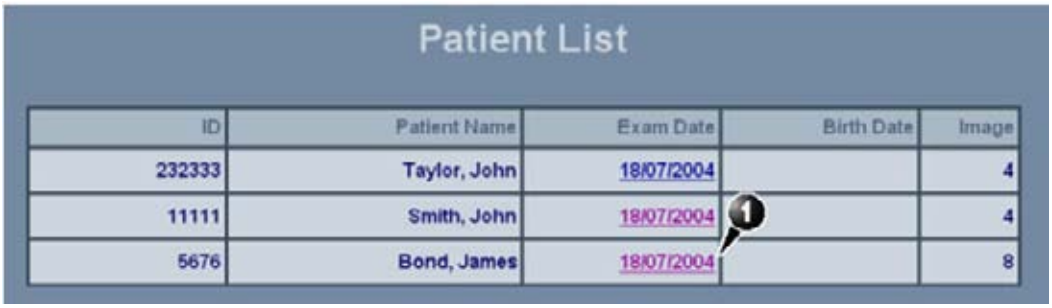


Figure 3-181 MPEGVue Patient List

3-7-9 Using MPEGVue/eVue on a Remote PC (cont'd)

NOTE: When viewing the examination which has been received from e-mail, a separate instance of MPEGvue application is opened, dedicated only for one e-mail examination. If you were previously viewing different MPEGvue Patient exams, you will need to switch over to the previous instance of the MPEGvue.

Receiving and Viewing a Partial Examination

In the event that the exam is large and a group of e-mails is expected, it is possible to view a partial exam, even before all of the e-mail messages have arrived.

In addition, if an e-mail message is lost or corrupted, the contents of the remainder of the received messages is available for review.

After receiving even one e-mail message out of many that have yet to arrive, simply select the new examination in the MPEGVue Screen. The screen display will show voids or missing thumbnail images in all places relating to the e-mail messages that have not yet arrived.

View previous exams from E-mail

1) From the MPEGVue Startup Menu, click on the **View previous exams from email** button.

   The Patient List is displayed, listing all exams received by email:

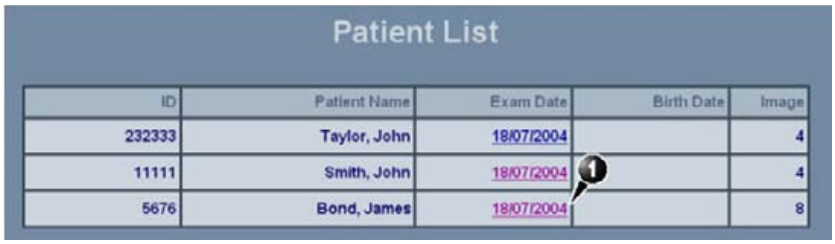


Figure 3-182 MPEGVue Patient List

2) Click on the required examination **Exam Date** (labelled 1 in the example above) to select and display images of that exam.

   The *MPEGVue screen* is displayed as shown in the example in Figure 3-159 "MPEGVue Screen" on page 3-141.

Activate e-Vue

1) From the MPEGVue Startup Menu, click on the **Activate e-Vue** button.

   The Patient List is displayed, listing all e-Vue exams received (refer to Figure 3-182 "MPEGVue Patient List" on page 3-155).

2) Click on the required examination **Exam Date** (labelled 1 in the example above) to select and display images of that exam.

   The *MPEGVue screen* is displayed as shown in the example in Figure 3-159 "MPEGVue Screen" on page 3-141.

3-7-9 Using MPEGVue/eVue on a Remote PC (cont'd)

Using Patient Manager

1) From the MPEGVue Startup Menu, click the Patient manager button.

The MPEGVue Patient Manager window opens, as shown below:

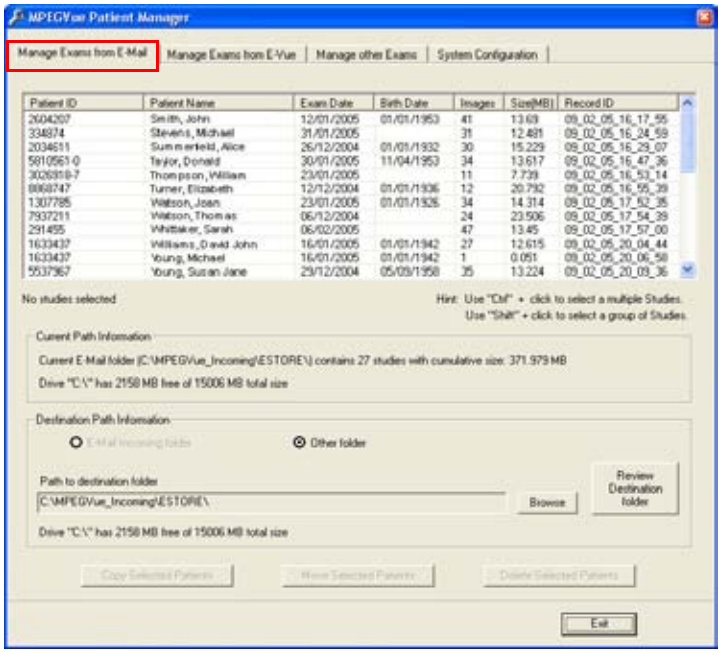


Figure 3-183 MPEGVue Patient Manager Window - Manage Exams from Email Tab

The MPEGVue Patient Manager window has four tabs that provide access to the following utilities:

- Manage Exams from Email
- Manage Exams from e-Vue
- Manage Other Exams
- System Configuration

NOTE: By default, when the MPEGVue Patient Manager window is first opened, the Manage Exams from Email tab is activated.

2.) **Manage Exams from Email**, as follows:

a.) Make sure the Manage Exams from Email tab is activated as shown in Figure 3-183 "MPEGVue Patient Manager Window - Manage Exams from Email Tab" on page 3-156.

The Patient List displays details - in table format - of all patient exams received by email (*Patient ID*, *Patient Name*, *Exam Date*, *etc*.).

The current path information is displayed below the Patient List as well as number of studies, cumulative size and amount of space available on the drive. By default, the destination path *Other Folder* radio button is enabled.

b.) Select the required exam or exams, as shown in Figure 3-184 "Exams Selected" on page 3-157.

(Use Ctrl +click to select more than one study; Shift + click to select a group of studies)

3-7-9 Using MPEGVue/eVue on a Remote PC (cont'd)

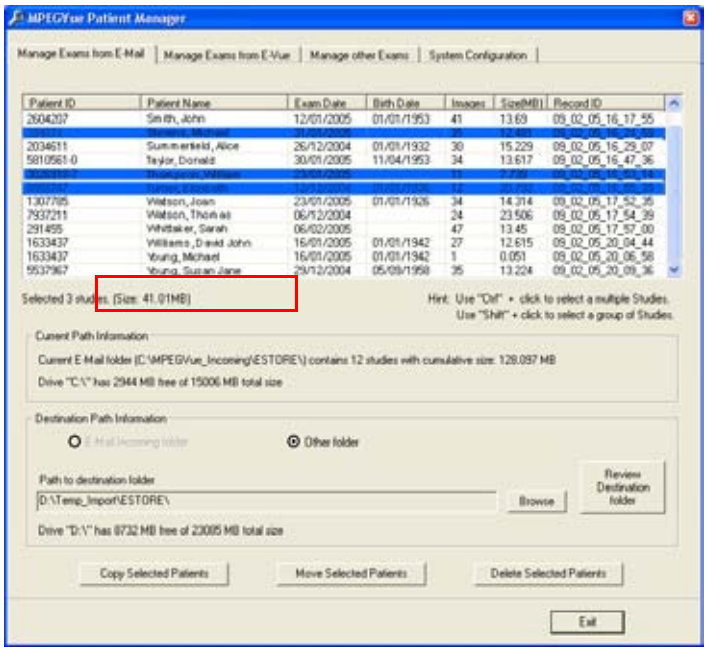


Figure 3-184 Exams Selected

The currently-selected exams are now highlighted in the list and, as shown in Figure 3-184 "Exams Selected" on page 3-157, the cumulative size of the 3 studies is displayed below.

The three study management buttons are now as follows:

Delete Selected Patients - enabled

Copy Selected Patients and *Move Selected Patients* - remain disabled until at least one Study has been selected and the Destination Path has been specified (providing the destination is NOT read-only media [such as, CD/DVD-ROM]). Only when *both* these tasks have been performed will these two buttons become enabled.

c.) To **copy** or **move** the selected exams, first click the Browse button and select the required destination folder, then click the **Copy Selected Patients** *or* **Move Selected Patients** button as appropriate.

(If necessary, click the Review Destination folder button to review the destination folder Patient List).

During the copy or move operation, the relevant message and progress bar is displayed:

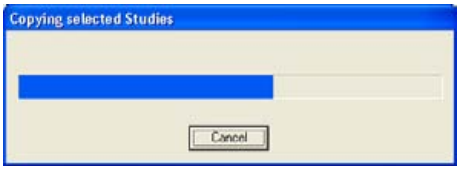


Figure 3-185 Copy or Move Progress Dialog

NOTE: When the selected studies have been copied to the destination folder, they will remain listed in the MPEGVue Patient Manager Patient List. However, if they have been moved, they will no longer be listed.

3-7-9 Using MPEGVue/eVue on a Remote PC (cont'd)

d.) To **delete** the selected exams, click the **Delete Selected Patients** button.

The user is prompted with the following warning message.

Figure 3-186 Warning Dialog

3.) Click **Yes** to confirm the delete command.

NOTE: When the selected studies have been deleted, they will no longer be listed in the MPEGVue Patient Manager Patient List.

4.) **Manage Exams from E-vue**, as follows:

a.) Make sure the Manage Exams from Evue tab is activated as shown in Figure 3-187 "MPEGVue Patient Manager Window - Manage Exams from E-VueTab" on page 3-158.

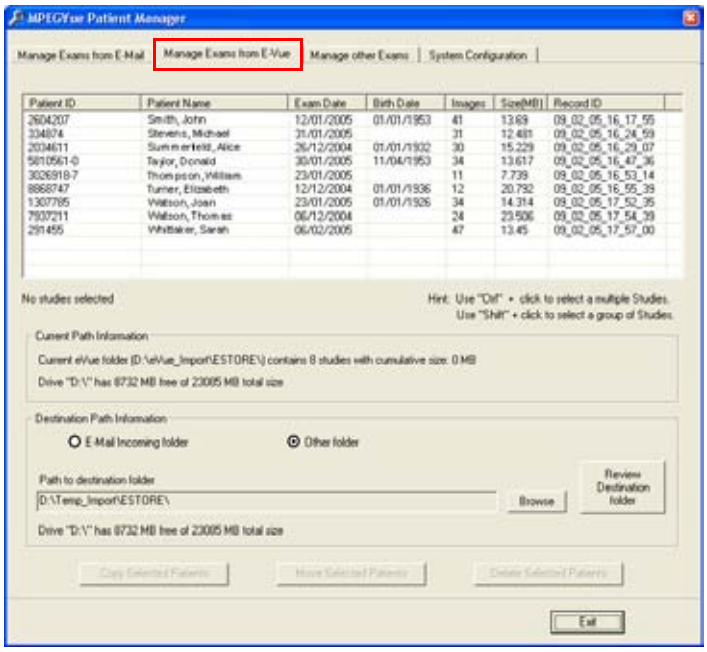


Figure 3-187 MPEGVue Patient Manager Window - Manage Exams from E-VueTab

The Patient List displays details - in table format - of all patient exams received via export from E-Vue (*Patient ID*, *Patient Name*, *Exam Date*, *etc.*).

The current path information is displayed below the Patient List as well as number of studies, cumulative size and amount of space available on the drive. By default, the destination path *Other Folder* radio button is enabled.

b.) Select the required exam or exams - refer to step b on page 3-156.

c.) **Copy** or **move** the selected exam/s, as required - refer to step c on page 3-157.

d.) If required, **delete** the selected exam/s - refer to step d on page 3-158.

3-7-9 Using MPEGVue/eVue on a Remote PC (cont'd)

5.) **Manage Other Exams**, as follows:Make sure the Manage Other Exams tab is activated as shown in Figure 3-188 "MPEGVue Patient Manager Window - Manage Other Exams Tab" on page 3-159.

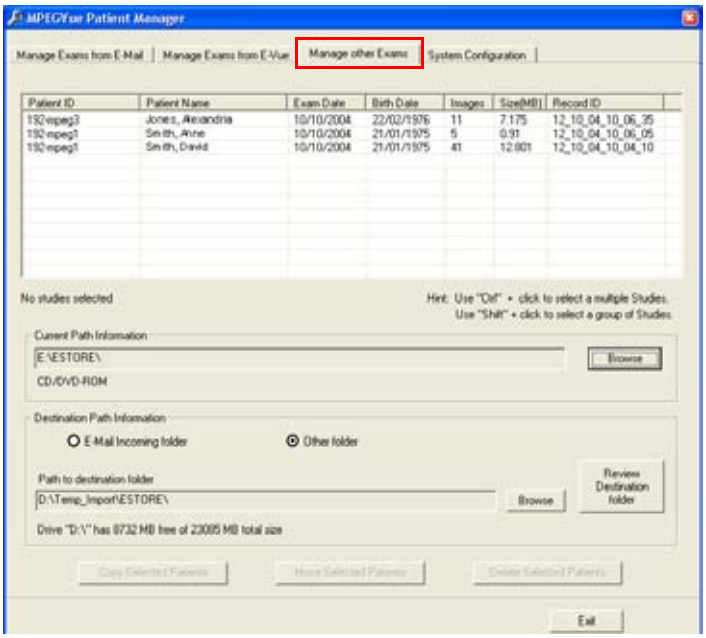


Figure 3-188 MPEGVue Patient Manager Window - Manage Other Exams Tab

NOTE: When the Manage Other Exams tab is first activated, the MPEGVue Patient Manager Window opens (by default) with the most recently-selected source directory active (even if the user selected this directory during Copy, Move, or Delete operations performed under another tab). At this stage, no information will be displayed in the Patient List.

Once the user has specified any source directory that contains MPEGVue studies (these may be located on CD/DVD-ROM, DOK or any local hard drive), exam details are displayed (in table format) in the Patient List. The information shown includes *Patient ID*, *Patient Name*, *Exam Date*, *etc*. as seen in the example in Figure 3-188 "MPEGVue Patient Manager Window - Manage Other Exams Tab" on page 3-159.

The current path information is displayed below the Patient List together with details of the removable media (e.g., CD/DVD-ROM). By default, the destination path *Other Folder* radio button is enabled; additional information below shows the Path to destination folder.

e.) Select the appropriate **Current Path Information** - if necessary, click the adjacent **Browse** button and select the correct source directory.

All patient exams found in the currently-selected source directory are listed in the Patient List.

f.) Select the appropriate **Path to Destination Folder** - if necessary, click the adjacent **Browse** button and select the required directory.

g.) From the Patient List, select the required exam/s to be copied.

If the currently-selected source directory is CD/DVD-ROM (read-only media), the *Copy Selected Patients* button is now enabled, as shown in Figure 3-189 "Exams Selected for Copying" on page 3-160.

NOTE: If the currently-selected source directory is DOK or the local hard drive, the Delete Selected Patients and the Move Selected Patients buttons are also now enabled.

3-7-9 Using MPEGVue/eVue on a Remote PC (cont'd)

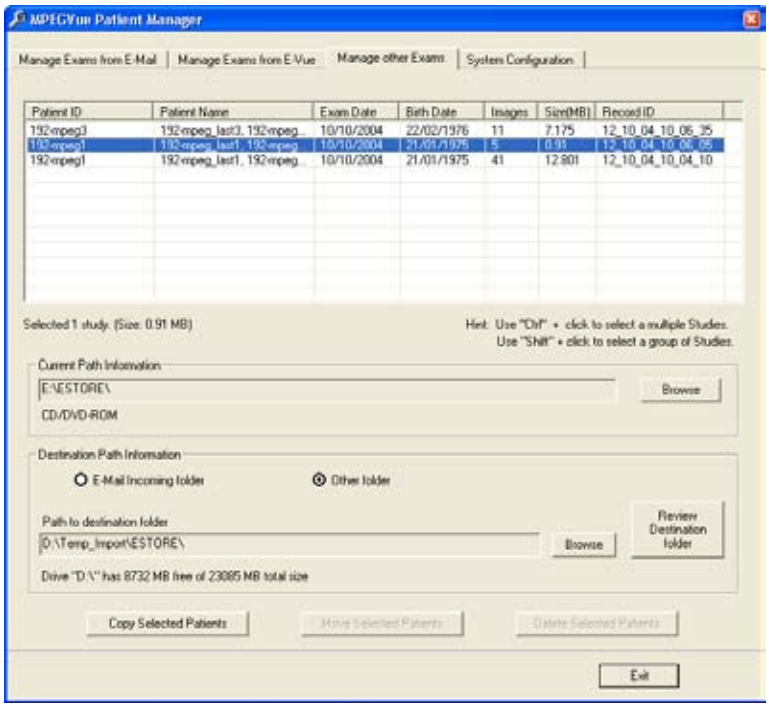


Figure 3-189 Exams Selected for Copying

h.) Click the **Copy Selected Patients** button.

During the copy operation, the following message and progress bar is displayed:

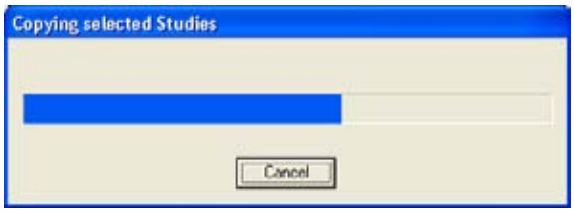


Figure 3-190 Copy Progress dialog

When done, the currently-selected exam/s are available in the destination folder for review..

3-7-9 Using MPEGVue/eVue on a Remote PC (cont'd)

6.) If required, access the **System Configuration** utility, as follows:

a.) Make sure the System Configuration tab is activated as shown in Figure 3-191 "MPEGVue Patient Manager Window - System Configuration Tab" on page 3-161.

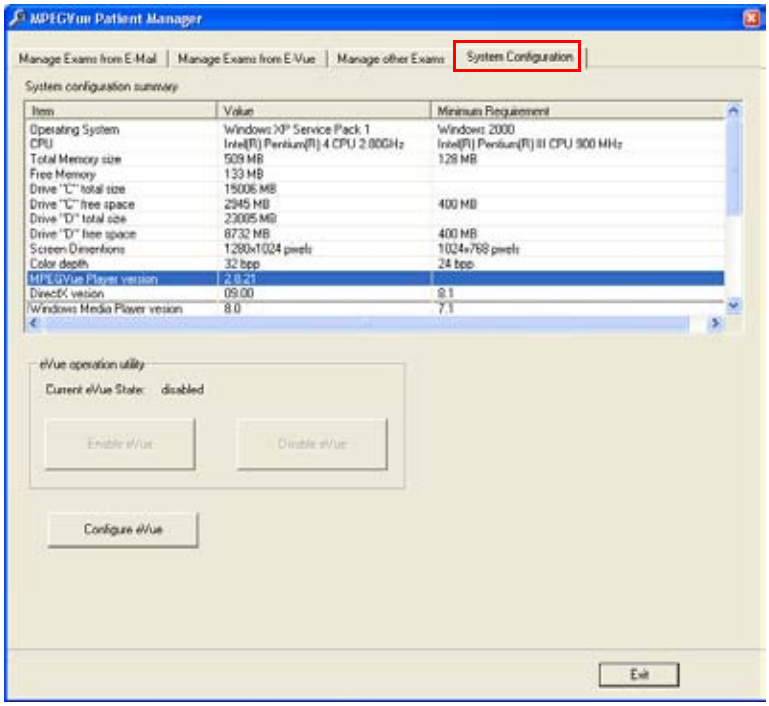


Figure 3-191 MPEGVue Patient Manager Window - System Configuration Tab

System Configuration read-only information is displayed (in table format) under the following column headings: *Item*, *Value*, *Minimum Requirements.*

Below this information, the **eVue Operation Utility** buttons enable the user to *enable* or *disable* the eVue mode, as required. An additional button (**Configure eVue**) is used to perform the eVue configuration procedure. THIS PROCEDURE FOR AUTHORIZED USERS ONLY?

NOTE: In order to enable eVue operation, it is necessary to first perform the eVue configuration procedure as described in the following step.

b.) Configure eVue (if required), as follows:

Click the **Configure eVue** button. The Configuration dialog box opens:

3-7-9 Using MPEGVue/eVue on a Remote PC (cont'd)

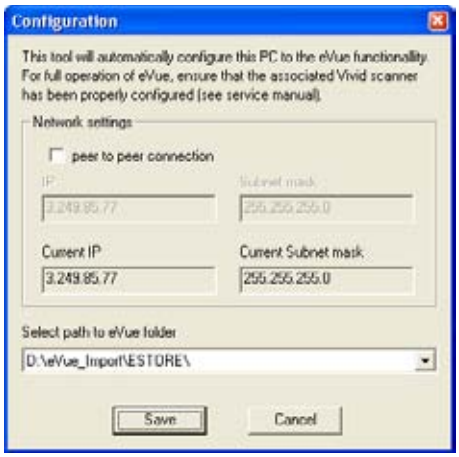


Figure 3-192 The eVue Configuration Dialog Box

Select the required eVue folder destination drive:

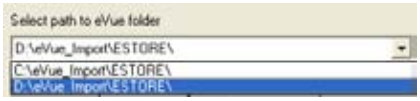


Figure 3-193 Peer to Peer Connection Selection Dialog

If applicable, enable the **peer-to-peer connection** check box then type the correct current IP address and Subnet mask details:

Figure 3-194

Click **Save** to save the new configuration.

The Enable eVue button is now active, as shown in Figure 3-195 "System Configuration - Ready to Enable eVue Mode" on page 3-163.

3-7-9 Using MPEGVue/eVue on a Remote PC (cont'd)

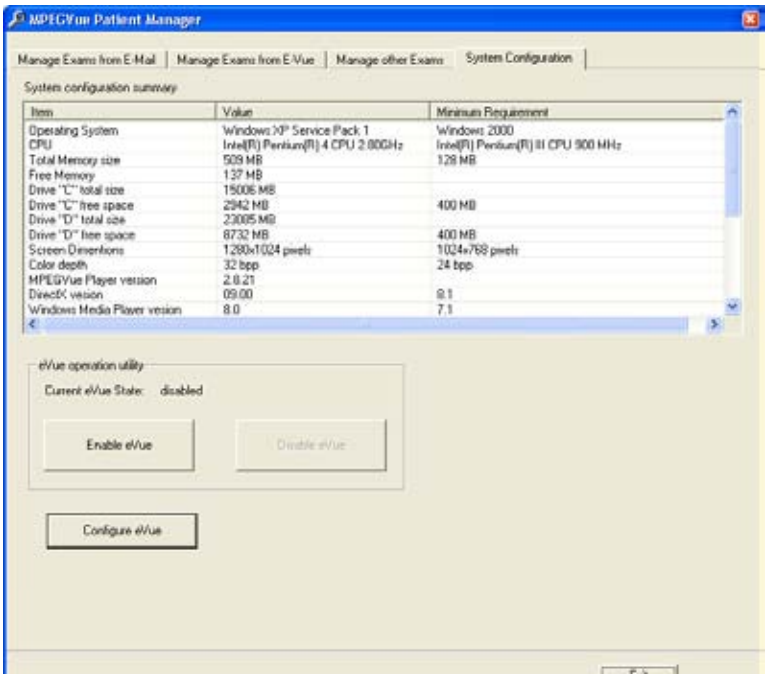


Figure 3-195 System Configuration - Ready to Enable eVue Mode

NOTICE **IMPORTANT** To avoid system configuration inconsistencies, before using the **Enable eVue** or **Disable eVue** functions, make sure that your PC is connected to the appropriate network and that all network cables are properly connected. Otherwise, configuration of your PC may become incorrect and the Configuration utility will be unable to execute the *Enable eVue* or *Disable eVue* operations.

In cases of a peer-to-peer connection, before using **Enable eVue** always make sure the two computers (Vivid S5 N or Vivid S6 N scanner and your PC) are properly configured and connected directly. Before using **Disable eVue**, your PC should be connected back to the local network.

c.) Click the **Enable eVue** button to activate the eVue operation.
The following message is displayed:

Figure 3-196 Message Dialog

Click **OK** to close the message.

NOTE: The Disable eVue button is now active.

3-7-9 Using MPEGVue/eVue on a Remote PC (cont'd)

d.) When required, click the **Disable eVue** button to de-activate the eVue operation.
The following message is displayed:

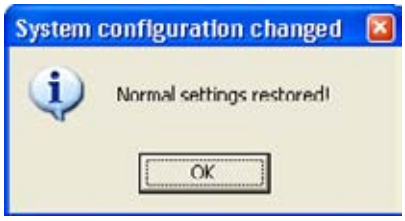


Figure 3-197 Message dialog

3-7-9-3-13 Using MPEGVue Player

1.) On the remote computer, open the media (CD or Memory Stick) containing the MPEGVue files, or the folder which was set as being shared for import of eVue files.
2.) On the remote computer, open the folder which was set as being shared for import of eVue files.
3.) Double-click on the START_MpegVue Player icon, as shown below:

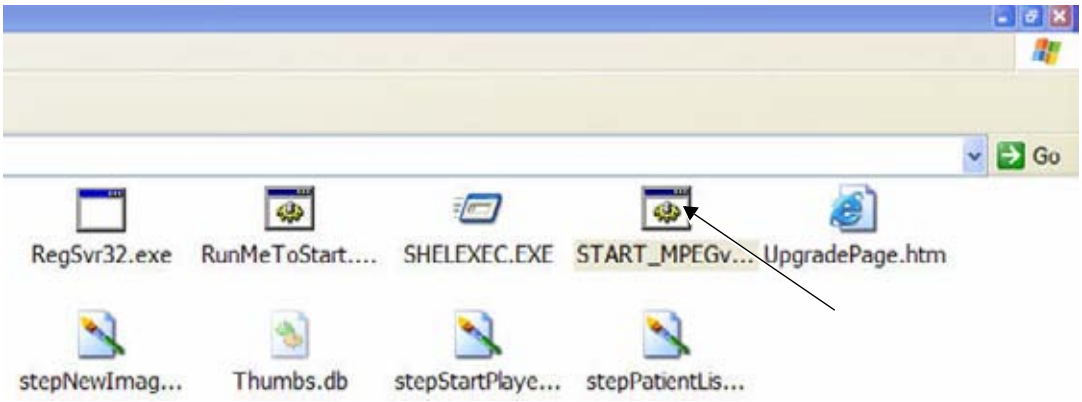


Figure 3-198 Location of MPEGVue player Start Icon

NOTE: On most computers, when inserting the CD media with MpegVue files, the MpegVue Player will start automatically (due to the autoplay option of CD-ROM).

In the event that any updates are required on the remote computer, the program will prompt the user to install the appropriate components, as necessary. (Follow the on-screen instructions).

When done, the Patient List is displayed.

4.) From the Patient List, double-click on the required examination **Exam Date** (see the example below) to select and display images of that exam.

3-7-9 Using MPEGVue/eVue on a Remote PC (cont'd)

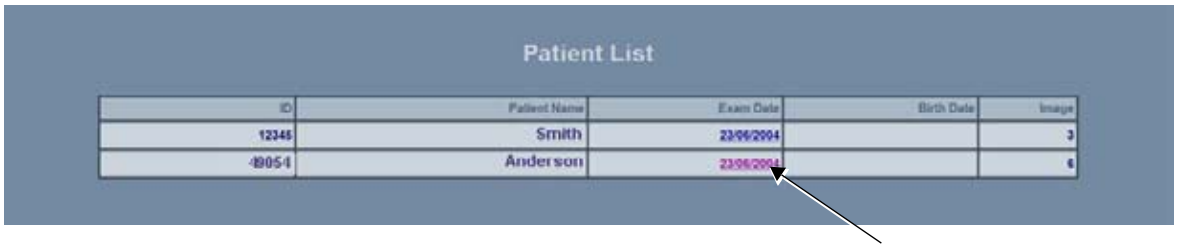


Figure 3-199 Patient List

The Image Review window opens, displaying thumbnail pictures of all the currently-selected patient's images - see Figure 3-200 "Image Review Window" on page 3-165.

Figure 3-200 Image Review Window

5.) From thumbnails mini-pictures (on the left of the screen), select one for review.

The selected image is displayed in the Image Review window.
As new images are transferred to the remote computer, a message is displayed at the bottom of the image currently being reviewed.

6.) Press <**F5**> to refresh the screen.

Additional thumbnail pictures will be displayed accordingly.

NOTE: The MpegVue Player can be used as a regular player, using the Play, Stop, Forward, and Rewind buttons. In addition, the user can forward images by e-mail, save images, and perform measurements, as previously described.

The MpegVue Player displays two rows of command keys at the bottom of the screen. If the remote computer is set up to view many Tool Bars, the lower row of the MpegVue command keys might not be visible. Therefore, it is recommended to remove most Tool Bars (by selecting <View> <Tool Bars> and un-checking all tools that are not required) until both lines of command keys are visible, as shown below.

3-7-9 Using MPEGVue/eVue on a Remote PC (cont'd)

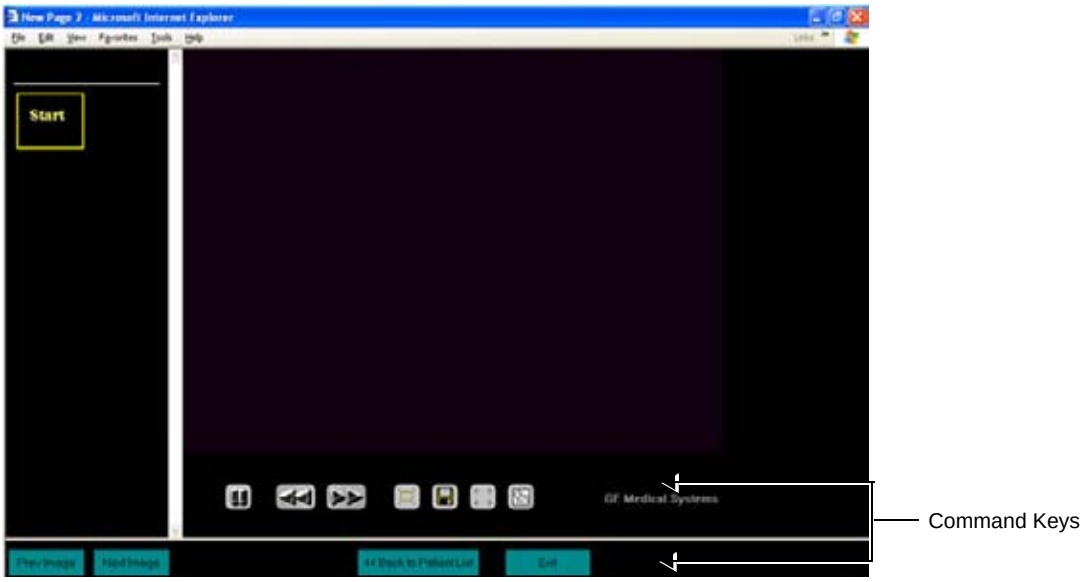


Figure 3-201 MPEGVue Player - Command Keys

Section 3-8
Storing and Transporting the Unit

The Vivid S5 N or Vivid S6 N ultrasound unit weighs up to 65 kg (99 lbs), depending on the configuration. To avoid equipment damage and ensure maximum safety while transporting or moving the unit, the following precautions are recommended:

- Before moving, disconnect all cables from the Vivid S5 N or Vivid S6 N scanner for any peripheral that is not currently mounted on the system.
- While moving the unit, follow all safety precautions, as described in the 3-8-1 "Safety Precautions for Moving the Vivid S5 N or Vivid S6 N Unit" on page 3-167.
- When transporting the unit by vehicle, or shipping by air or any other means:
  - Pack the unit in the original packing. Refer to the information in “Unpacking the Cardboard Shipping Carton” on page 8.
  - Follow all safety precautions.
  - Handle with care.
- When reinstalling the unit, always check *both* ends of any cable connections to the system (e.g. peripherals) to ensure cables are properly connected. Confirm that all switches are in the correct position. Allow sufficient system acclimation time, as described in 3-2-2-1 "System Acclimation Time" on page 3-2.

3-8-1 Safety Precautions for Moving the Vivid S5 N or Vivid S6 N Unit

CAUTION: Whenever moving the ultrasound unit, always observe the following safety precautions:

1) Proceed cautiously when crossing door or elevator thresholds. Grasp the front handle grips or the back handle bar, and then push or pull. **DO NOT** attempt to move the unit by pulling its cables or probe connectors.
2) Ensure that the unit does not strike walls or door frames.
3) Ensure that the pathway is clear.
4) Move the unit slowly and carefully.
5) Take extra care while moving the unit long distances and on inclines.
6) Avoid ramps with an incline of greater than ten degrees to prevent the unit from tipping over. Once the destination is reached, lock the front wheel brakes.

3-8-2 Cardboard Shipping Carton and Packaging Materials

Verify that the required packing materials are available. All these materials are required to safely package and transport the Vivid S5 N or Vivid S6 N ultrasound unit in the cardboard shipping carton for shipment by vehicle, or any other means.

For more details, refer to the appropriate procedure for 3-3-1 "Unpacking the Cardboard Shipping Carton" on page 3-8 and follow the instructions in reverse order.

Section 3-9
Completing the Installation Paperwork

NOTE: On completion of a Vivid S5 N or Vivid S6 N ultrasound scanner installation, it is important to record the relevant System Installation details (see Table 3-15 "System Installation Details" on page 3-168) and Product Locator Installation details (see Figure 3-202 "Product Locator Installation Card (ICD)" on page 3-169), for future reference.

3-9-1 System Installation Details

Enter the serial number printed on the main label (refer to the *Product Labels and Icons* section, on page 1-10), and the other relevant system installation details into the following table:

Table 3-15 System Installation Details

System S/N:	
Location:	
Date:	
Customer Name:	
Service Engineer's Name:	
Comments:	

3-9-2 Product Locator Installation

NOTE: During and after installation, the documentation (i.e. User Manuals, Installation Manuals...) for the peripheral units must be kept as part of the original system documentation. This will ensure that all relevant safety and user information is available during the operation and service of the complete system.

1) Verify that all details have been entered in the System Installation Details form, as described in the 3-9-1 "System Installation Details" on page 3-168. If this form has not been completed, enter the details now.

2) Locate the Product Locator Installation Card(s) that are affixed to the monitor and to each of the peripherals, and fill in all details on both the front and back of the card(s) - see Figure 3-202 "Product Locator Installation Card (ICD)" on page 3-169.

NOTE: Step 2 may have been completed already by GE personnel.
The Product Locator Installation Card shown in Figure 3-202 "Product Locator Installation Card (ICD)" on page 3-169 may not be identical to the card(s) provided.

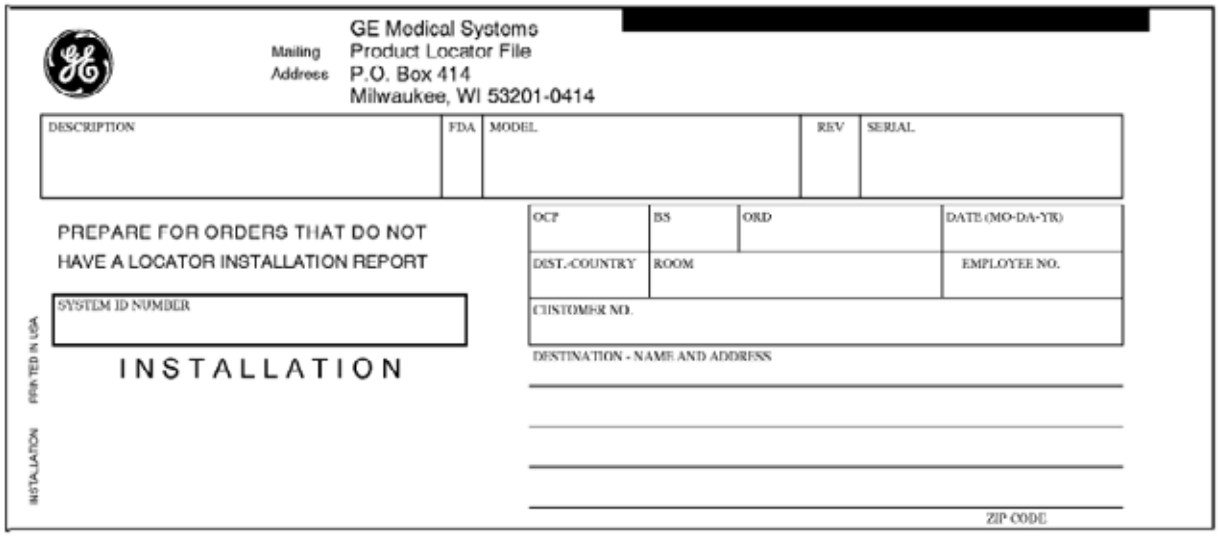


Figure 3-202 Product Locator Installation Card (ICD)

3.) Mail the Product Locator Installation Card(s) to the appropriate product center.

3-9-3 User Manual(s)

Check that the correct *Vivid S5 N or Vivid S6 N User Manual(s)* for the system (and relevant software revision), is included with the installation. Specific language versions of the *Vivid S5 N or Vivid S6 N User Manual* may also be available. Check with your GE Sales Representative for availability.

During and after installation, supplementary documentation (such as, *User Manuals* and *Installation Manuals* for the peripherals) must be kept as part of the original system documentation. This will ensure that all relevant safety and user information is available during the operation and service of the complete system.

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Chapter 4
Functional Checks

Section 4-1
Overview

4-1-1 Purpose of Chapter 4

This chapter describes the functional checks that must be performed either as a part of the installation procedure, or as required during servicing and periodic maintenance of the Vivid S5 N or Vivid S6 N ultrasound scanner.

NOTE: Refer to Chapter 7 - Diagnostics/Troubleshooting for detailed descriptions of some of the functional checks described in this chapter.

Table 4-1 Contents in Chapter 4

Section	Description	Page Number
4-1	Overview	4-1
4-2	General Procedures	4-2
4-3	Functional Checks	4-17
4-4	System Turnover Checklist	4-36
4-5	Site Log	4-37

4-1-2 Specific Equipment Required

- Empty media (CD-R or memory card)
- ECG Pads
- ECG Cable:
  - AHA/AMERICAS, P/N: 2256477

    OR

  - IEC / EUROPE, ASIA, ROW, P/N: 2256478
- At least one probe (ideally you should check all the probes used on the system by the site.)

  See 9-3-7 "Probes" on page 9-16 for an overview of available probes.

Section 4-2
General Procedures

4-2-1 Overview

Since some general procedures are used more than others, for convenience, all the procedures described in this section are listed below:

- *Power ON/Boot-up section*, page 4-2
- *Power Shut Down section*, page 4-7
- *Log On to the System as ADM section*, page 4-10
- *Using Removable Media section*, page 4-12
- *Labeling Removable Media section*, page 4-14
- *Formatting Removable Media section*, page 4-14
- *DICOM Repair of Removable Media section*, page 4-14
- *Archiving and Restoring System Configuration section*, page 4-14

4-2-2 Power ON/Boot-up

4-2-2-1 Connecting Mains Power to the Vivid S5 N or Vivid S6 N Ultrasound Unit

DANGER **To avoid the risk of fire, power to the system must be supplied from a properly rated outlet. It is recommended to use a dedicated power outlet. The power plug should not, under any circumstances, be altered to a configuration rated less than that specified for the current.**
DO NOT use an extension cord or adaptor plug. Refer to the Electrical Requirements section, on page 2-3 for more details.

4-2-2 Power ON/Boot-up (cont'd)

DANGER **ALWAYS CONNECT THE UNIT TO A FIXED POWER SOCKET WHICH HAS THE PROTECTIVE GROUNDING CONNECTOR**

DANGER **NEVER USE A THREE-TO-TWO PRONG ADAPTER; THIS DEFEATS THE SAFETY GROUND.**

DANGER **ENSURE THAT THE POWER CORD AND PLUG ARE INTACT AND THAT THE POWER PLUG IS THE PROPER HOSPITAL-GRADE TYPE (WHERE REQUIRED).**

NOTICE Use only power supply cords, cables and plugs provided by or designated by GE HEALTHCARE.

CAUTION **The system requires all covers.**
Operate this unit only when all board covers and frame panels are securely in place. The covers are required for safe operation, good system performance and cooling purposes.

NOTE: When turning on a system from standby mode, it takes a few seconds before it responds. Do not push the On/off button again during this period. A second push will initiate a full shutdown.

NOTE: If the unit has been in the OFF condition for an extended period of time, (3 to 5 days or more), the unit may not boot, or may beep when turned on.

Follow These Steps to Connect Mains Power to the Unit

Connecting the Vivid S5 N or Vivid S6 N ultrasound unit involves preliminary checks of the power cord, voltage level and compliance with electrical safety requirements.

1) Ensure that the wall outlet is of appropriate type, and that the power circuit breaker is turned OFF.
2) Uncoil the power cable, allowing sufficient slack so that the unit can be moved slightly.
3) Verify that the power cable is without any visible scratches or any sign of damage.
4) Verify that the on-site mains voltage is within the limits indicated on the rating label on the Vivid S5 N or Vivid S6 N ultrasound scanner.
5.) Connect the Mains Power Cable female plug to the Power Inlet (AC IN - refer to Figure 4-1 "Mains Power Connector - Rear Panel" on page 4-3) at the rear of the unit. Use the cable clip to secure the cable firmly in the socket

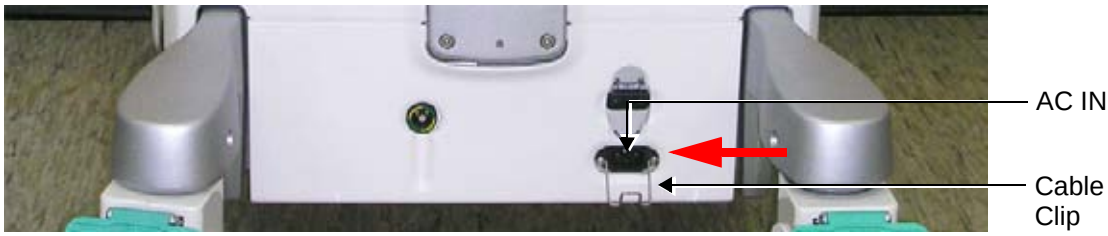


Figure 4-1 Mains Power Connector - Rear Panel

4-2-2 Power ON/Boot-up (cont'd)

NOTE: In the next step, it is necessary to screw the plastic cable clamp (into the hole provided in the support column - centrally located at the rear of the system, see Figure 4-2 "Plastic Cable Clamp and Securing Screw" on page 4-4).
Then, to route the Mains Power cable upwards and through the clamp, and secure the clamp in position to prevent the cable from dangling down and becoming caught in the wheels when moving the scanner (see Figure 4-3 "Mains Power Cable Secured with Plastic Cable Clamp" on page 4-4).

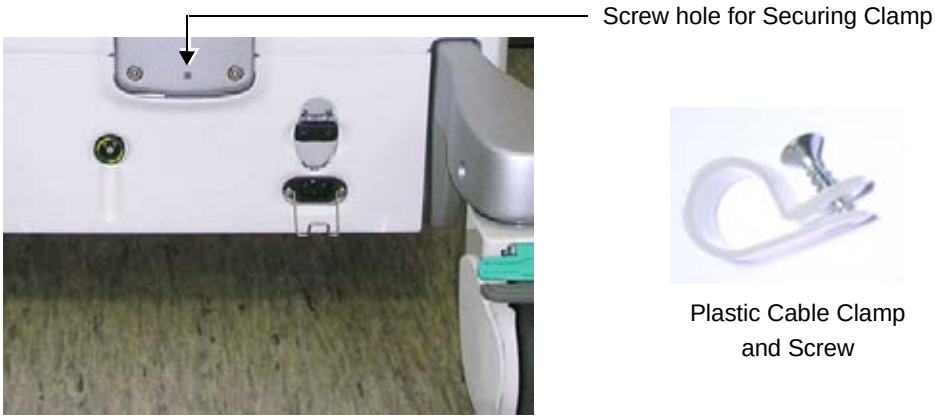


Figure 4-2 Plastic Cable Clamp and Securing Screw

6.) Proceed as follows:

a.) Loosen the screw to open the plastic cable clamp.

b.) Route the cable *upwards* and through the clamp.

c.) Screw the clamp into position on the support column, carefully tightening the screw sufficiently to secure the cable firmly in the clamp.
Take care not to overtighten the screw, or damage the cable!

Figure 4-3 Mains Power Cable Secured with Plastic Cable Clamp

7.) Connect the other end (male plug) of the Mains Power Cable to a hospital-grade mains power outlet with the proper rated voltage.

8.) Turn ON the circuit breaker at the rear of the system.

The unit is now ready for Power ON/Boot Up.

4-2-2 Power ON/Boot-up (cont'd)

4-2-2-2 Turning the System ON

1) Verify that the ultrasound unit has been connected to the mains power wall outlet via the AC connector on the rear of the system (as previously described) and that mains power is turned ON.

NOTICE When AC power is applied to the scanner and circuit breaker is ON, the **On/Off** button on the control console illuminates, indicating the Back-end Processor is ready for boot-up.

2) Hold down the **On/Off** button (Figure 4-4 "On/Off Button on Control Panel" on page 4-5) on the control panel for 3 seconds.

The system automatically performs an initialization sequence that includes the following:

- Loading the operating system.
- Running a quick diagnostic check of the system.
- Detecting connected probes.

Figure 4-4 On/Off Button on Control Panel

During normal boot-up, you may observe that:

a.) The unit's ventilation fans start on full speed, but slow down after a few seconds (listen to the fan noise).

b.) Power is distributed to the peripherals, Operator Panel (control panel), Monitor, Front-End Processor and Back-End Processor.

4-2-2 Power ON/Boot-up (cont'd)

c.) The Back-End Processor and the rest of the scanner commences the following sequence (in the listed order of steps):

1.) Back-End Processor is turned ON and starts to load the software.

2.) The Start Screen is displayed on the monitor (Figure 4-5 "Start-up Screen" on page 4-6).

3.) A start-up progress bar indicating the time used for software loading, is displayed.

Figure 4-5 Start-up Screen

4.) The software initiates and sets up the Front-End electronics and the rest of the scanner.

5.) The Keyboard backlight illuminates.

6.) As soon as the software has been loaded, a 2D screen is displayed on the monitor, as shown below.

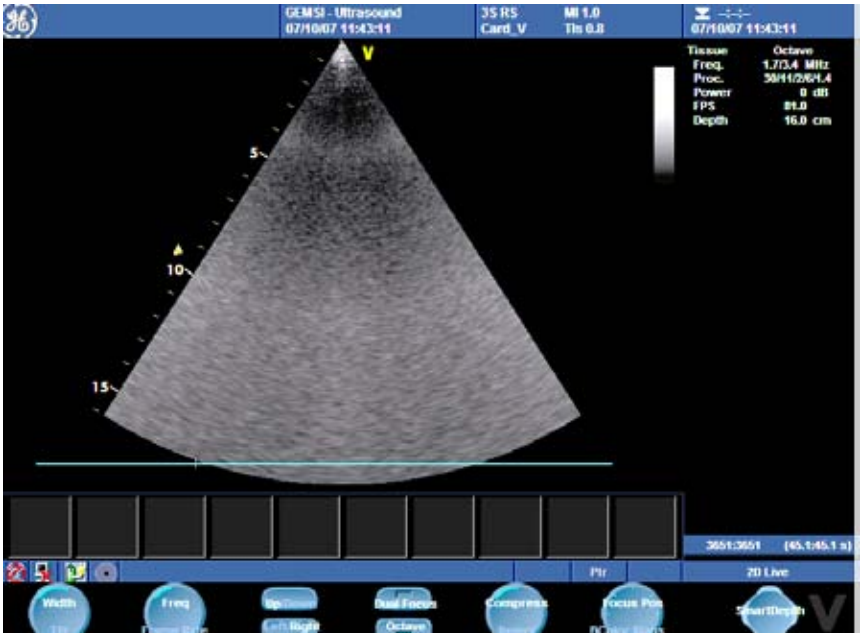


Figure 4-6 2D Screen

NOTE: Total time used for start-up is typically 3 minutes.

4-2-3 Power Shut Down

When switching the unit OFF, the system performs an automatic shutdown sequence.

NOTE: After turning OFF the system, wait at least 10 seconds before turning it on again. The system may not be able to boot-up if power is recycled too quickly.

The system can be switched OFF in one of two ways, as follows:

- Holding down the **On/Off** button for 3-5 seconds will evoke the display of the System Exit dialog box (see Figure 4-7 "System Exit Dialog Box" on page 4-7). From this, you can either select *Full Shutdown* (click the **Shutdown** button) or choose to place the system in *Standby Mode* (click the **Standby** button). Both these procedures are described in detail below..

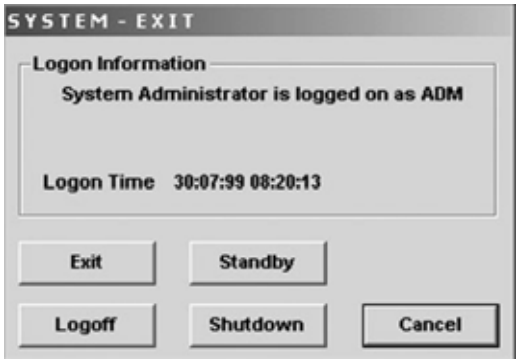


Figure 4-7 System Exit Dialog Box

- Holding down the **On/Off** button for more than 8 secs will cause the system to perform *Emergency Shutdown.* This is not recommended under normal circumstances.

NOTE: The system will remain in Standby Mode for 90 mins.

The System - Exit dialog box, used when switching OFF the unit, provides the following choices:

- **Standby**
  Use this button to select the Standby mode, allowing a shorter reboot time. Most of the system is powered down, but a certain portion of the unit remains energized. The standby mode allows a shorter re-boot time when the system is used on a daily basis or moved from one place to another.
- **Logoff**
  Use this button to log off the current user.
  The system remains ON and ready for a new user to log on.
  (If the Logoff button is dimmed, it indicates that no user is logged on to the unit at the moment.)
- **Shutdown**
  Use this button to Shut Down the system. The entire system is shut down. It is recommended to perform a full shutdown at least once a week.
- **Cancel**
  Use this button to close Exit Dialog box - Exit dialog box and return to the previous operation.
- **Exit**
  This button appears only if the application software was activated from *Maintenance* mode. Use this button to exit from the System Application software and return to the Windows Desktop.

4-2-3 Power Shut Down (cont'd)

4-2-3-1 Standby Mode

Follow the steps below to select Standby Mode

This procedure describes the steps required to power down the unit to Standby mode:

NOTE: Don't press the On/Off button too long. If you press the button too long (more than 3-4 seconds), a full shutdown is started.

1.) Hold down the **On/Off** button for 3-5 seconds to evoke the display of the System Exit dialog box (see Figure 4-7 "System Exit Dialog Box" on page 4-7).
2.) Click the **Standby** button to activate Standby mode.
3.) Leave the mains power cable connected to keep the standby battery fully charged.

Follow steps below if you need to disconnect power cable when unit is in standby mode

1.) Switch OFF the Mains Power from the wall outlet.
2.) Disconnect the power cable.

The system will remain in Standby mode until the battery reaches 15% of its full capacity. Reaching levels below 15% of battery full capacity will evoke a full shutdown.

As described above, the battery is automatically charged when the system is plugged into the wall outlet and the power is switched ON. It takes approximately 4 hours to charge a flat battery.

If the system is left in the OFF condition (system unplugged from the wall out let) for an extended period of time (3 to 5 days or more), the system may not boot up or may beep when turned ON. Should this occur, the system needs to recharge the batteries. This could take 15 minutes to as long as 4 hours, depending on the battery age, system input voltage and system temperature. To eliminate draining the batteries, the system should remain plugged into the wall outlet with the wall outlet power switch in the ON position.

NOTE: Connect the power cable to the mains power outlet again as soon as possible.

NOTE: When turning ON a system from standby mode, it takes a few seconds before it responds. Do not push the On/Off button again during this period. Pushing and holding the button for 8 secs will initiate a full shutdown.

4-2-3 Power Shut Down (cont'd)

4-2-3-2 Complete Power Down

NOTE: This function is not available from Standby mode.

Follow this procedure to perform a complete system power-down

1.) Hold down the **On/Off** button for 3-5 seconds to evoke the display of the System Exit dialog box (see Figure 4-7 "System Exit Dialog Box" on page 4-7).

2.) Select **Shutdown** to do a complete power down of the unit.

The Back-End Processor will first turn OFF the scanner activity and print the message "*Please wait - Shutdown in progress*" in the LCD display. Then system shut down commences.

The time required to power down the unit (including the Back-End Processor), may vary from 10 seconds up to approximately 1 minute. The last component that shuts down is the light in the LCD display, indicating that you may continue with the next step.

3.) Disconnect the mains power from the wall outlet. This will cut power distribution within the unit.

If the system is still running when you disconnect the mains power, the internal power supply will switch over to the battery power and supply the system with power until either the battery is drained to 15% capacity (invoking shut down), or shutdown has been invoked by the user.

4-2-4 Log On to the System as ADM

Table 4-2 Logging on to the System as ADM

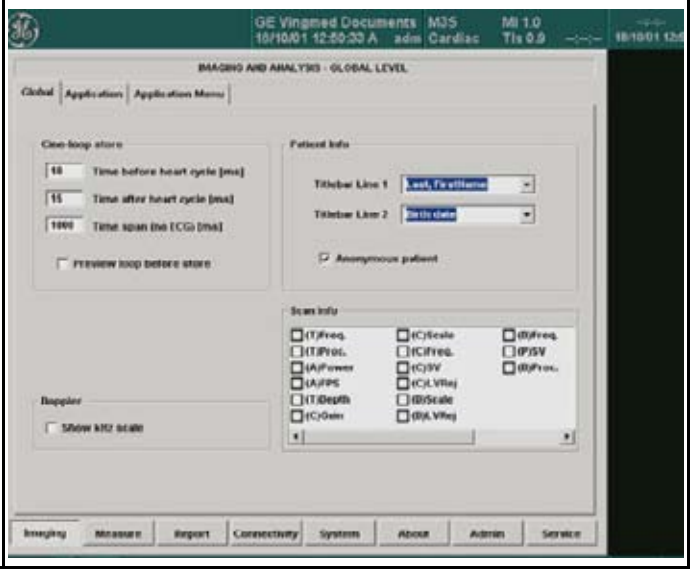
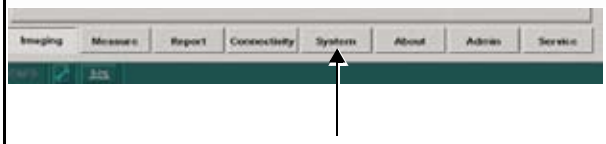
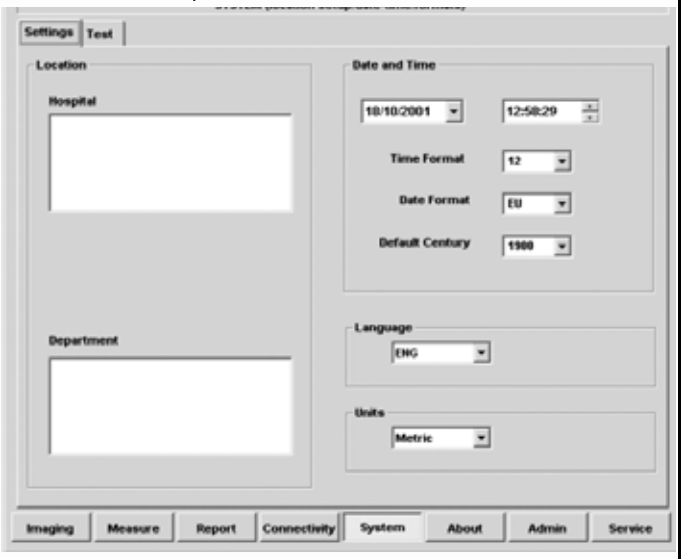
Step	Task	Expected Result(s)
1.	Press **Config** on the alphanumeric keyboard.	If not already logged on, the Operator Login window is displayed. Note: The default password is **ulsadm**
2.	Select the down-arrow to the right of the Operator field to view the Operator pull down list. From the factory, the following two users are defined without a password: - adm - usr It is possible for the administrator (*adm*) to establish unique passwords for each user, but do not do this now.	
3.	Select the user *adm*. - From the factory, the password has been left blank, so you may try to log on without using any password. - If the log-on fails, you may try to use the password **service**. - As a last resort, contact the hospital's Network Administrator (or person responsible for the ultrasound unit), and ask for the password. The Emergency button stores data only from current patient examination.	
4.	Select **Log on**.	- If this is the first time the unit is turned on, the "IMAGING AND ANALYSIS - GLOBAL LEVEL" window is displayed. - If another screen was displayed earlier, before logging out or turning the unit OFF, that screen will be displayed. 

Table 4-2 Logging on to the System as ADM (cont'd)

Step	Task	Expected Result(s)
5.	Select System to access the System Setup window. 	The System Settings window is displayed 
6.	Proceed to select the required settings.	

4-2-5 Using Removable Media

4-2-5-1 Introduction

Vivid S5 N and Vivid S6 N ultrasound scanners are equipped with a Magneto Optical Disk Drive (MO Drive) and a DVD/CD-RW Drive.

The MOD Drive can be connected to either of the USB ports (*upper* or *lower*) on the rear connectors panel. This connection must be via a USB-to-SCSI adaptor; one side of the adaptor being connected to the Vivid S5 N or Vivid S6 N USB port, and the other side to the rear of the MOD drive.

When connecting the MOD drive directly to the system, it is necessary to use an additional power source. **Dedicated peripheral power outlets are available at the rear of the system, providing power to the system's peripherals via an internal insulation transformer.**

The MOD Drive may be connected once the system is powered ON, or after shutdown. All software drivers for the MOD Drive are pre-configured and installed designated to be used with the specific MOD drive supplied by GE HEALTHCARE.

WARNING ***Do not attempt to use a different type of mass storage device other than the MOD Drive supplied with the system. The ultrasound system is an extremely sensitive and complex medical system. Any unauthorized peripherals may cause system failure or damage!***

4-2-5-2 Install MO Disk in MO Drive

NOTICE **Never move the unit with a MO disk in the Magneto Optical Disk Drive because the drive actuator will not be locked and the Magneto Optical Disk Drive could break.**

1.) Preparations before installing an MO disk in the MO Drive:
   a.) The unit must be turned ON and "up and running" before using the MO Drive
   b.) Verify the MO disk for loose hardware or damaged labels which could jam inside the MO Drive.
   c.) Ensure that the slide switch in one corner of the disk is set so that the disk is write enabled (disk hole closed).
2.) Insert the disk into the MO Disk Drive with the label for the side you intend to use, facing up.

NOTE: A new physical storage message is displayed.

4-2-5-3 Eject and Remove MO Disk from MO Drive

NOTICE ***Do not eject the MO Disk using the button on front of the MO drive.***

In some cases, the MO Disk is ejected automatically. If not automatically ejected, use the manual ejection method as described in the following steps:

1.) Press the **Eject** button on the keyboard

OR

Press <**Alt> + E** *on the alphanumeric keyboard to display the Eject Device menu.*

4-2-5 Using Removable Media (cont'd)

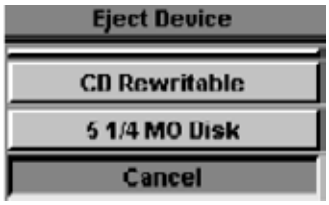


Figure 4-8 Eject Device Menu

2.) Select **5 1/4 MO Disk** in the Eject Device menu to eject the MO Disk.

3.) Remove the ejected MO Disk from the MO Drive and place it in its cover box for storage in a safe place.

4-2-5-4 Install CD-R Disk in CD Drive

1.) Press the Eject button on the right side of the CD Drive once to remove any media that may be present inside the drive. In addition, press the Eject button on the keyboard *or* press **ALT**+**E** on the alphanumeric keyboard and select **CD-Rewriteable**, then select Eject.

2.) Insert a CD-R disk into the CD drive with the label side facing *upwards*.

After a few seconds, the disk is available for reading, formatting or writing (depending on the type of disk you used).

NOTE: When inserting the CD-R disk into the CD drive, a message is displayed confirming that the media has been inserted. In addition, the CD icon (lower left bar) is enabled - indicating that there is media in the CD drive.

4-2-5-5 Eject and Remove CD-R Disk from CD Drive

⚠ **NOTICE** ***Do not eject the CD-R Disk using the button on front of the CD Drive.***

In some cases, the CD-R Disk is ejected automatically. If not automatically ejected, use the manual ejection method as described in the following steps:

1.) Press the **Eject** button on the keyboard

OR

Press <**Alt> + E** *on the alphanumeric keyboard to display the Eject Device menu (**Figure 4-8 "Eject Device Menu" on page 4-13**).*

2.) Select **CD-Rewriteable** in the Eject Device menu to eject the CD-R Disk.

NOTE: When ejecting the CD-R disk from the CD drive, the message Ejecting is displayed. In addition, the CD icon (lower left bar) is greyed out indicating that there is no media in the CD drive.

3.) Remove the ejected CD-R Disk from the CD Drive and place it in its cover box for storage in a safe place.

4-2-6 Labeling Removable Media

Before you start to format any Removable Media, be sure about what naming convention you will use for labelling.

- Use a logical name and make sure to physically label each Removable Media.
- Verify that each Removable Media is given a unique name. Maximum eleven (11) characters may be used for the label name (see note below).

NOTE: Only the following characters and signs can be used when labelling media:
A-Z, a-z, 0-9, "_" and "-".
Do not use more than 11 characters or signs. Also, do not use spaces or symbols.

- Remember that MO Disks have two sides, Side A and Side B. Each Side must have a unique name.

Example: MO Disks for storing images may be labeled "IMAGE_1A" (Side A on MO Disk #1), "IMAGE_1B (Side B on MO Disk #2), "IMAGE_2A"...

4-2-7 Formatting Removable Media

This procedure describes how to format an MO Disk or a CD-R disk.

Before you continue, be sure about what naming convention you will use for labelling the Removable Media.

1.) Select **Config** > **Connectivity** > **Tools.**
2.) Select the removable media from the *Media pop-up menu*.
3.) Enter a name for the removable media in the *Label field*.
4.) Press **Format**.
5.) Wait for display of the *Information window,* indicating that the formatting process is completed.

NOTICE ***Do not eject the CD using the button on the CD drive.***

6.) Press the **Eject** button on the keyboard or **<Alt> + E** on the alphanumeric keyboard to display the Eject Device menu (see Figure 4-8 "Eject Device Menu" on page 4-13).
7.) Select the relevant media.

The selected media is ejected.

4-2-8 DICOM Repair of Removable Media

1.) Insert the removable media to be verified.
2.) Select the pre-configured removable media from the **Config** > **Connectivity** > **Tools** pop-up menu.
3.) Press **Repair DICOM Dir.**

The unit starts to verify the DICOM directory on the selected media (if available), or (if not available) creates a DICOM directory.

4-2-9 Archiving and Restoring System Configuration

NOTE: Always save presets before any software reload. This action is necessary to ensure that the presets loaded after the software reload are as up–to–date as possible.

All user presets except changes to *Summary*, *Anatomy*, and *Biometry* pages, can be saved on an MO disk for reloading on the system.

4-2-9 Archiving and Restoring System Configuration (cont'd)

NOTICE Presets should not be saved on the same MO disk as images, because the Archive Menu lists the images but not the presets stored on a MO disk.

4-2-9-1 Backing Up System Configuration to Removable Media

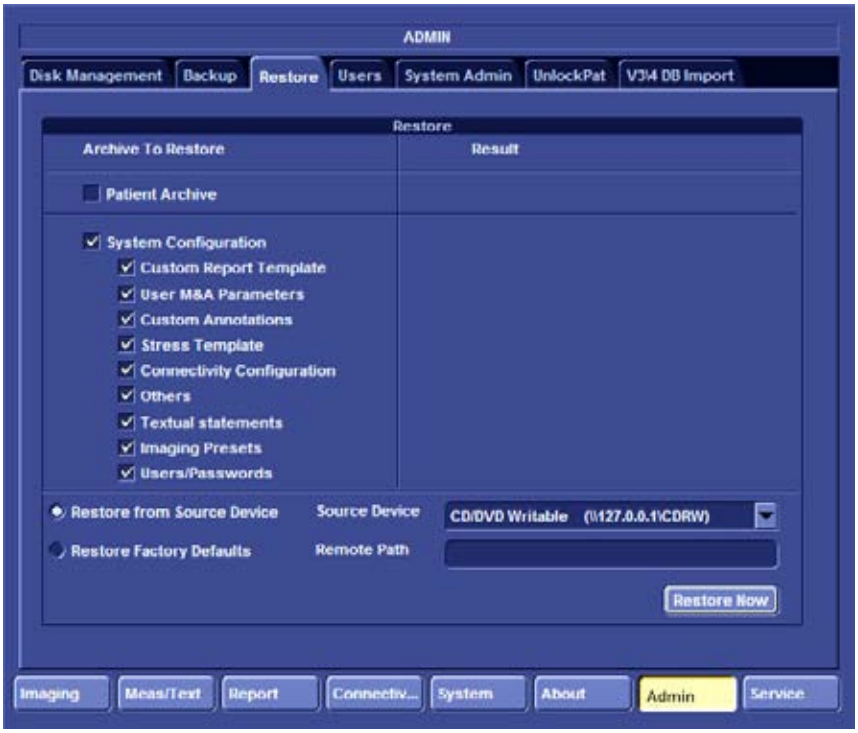
Table 4-3 System Configuration Backup to Media

STEP	TASK	FUNCTION
1.	Insert an empty, formatted MO disk labelled "PRESETS" and marked with Vivid S5 N or Vivid S6 N serial number and the date, into the MO Drive. For more information about formatting, see "Formatting Removable Media" on page 14.	
2.	Press **Config** (or **F2**); select **Admin** then select **Backup**.	The Backup window is displayed.
3.	Enable the **System Configuration** check box.	
4.	Select the MOD as the Destination.	
5.	Press **Start Backup**.	A copy of the Presets is saved on the MO disk.
6.	Press the **Eject** button on the keyboard or <**Alt> + E** on the alphanumeric keyboard.	The MO disk is ejected.

4-2-9 Archiving and Restoring System Configuration (cont'd)

4-2-9-2 Restoring System Configuration from an MO Disk

Table 4-4 Restoring System Configuration

STEP	TASK	FUNCTION
1.	Insert the MO disk with the archived presets into the MOD.	
2.	Press **Config** (or **F2**); select **Admin** then select **Restore**.	The Restore window is displayed. 
3.	Enable the **System Configuration** check box.	
4.	Select the MOD as the Source.	
5.	Press **Restore Now**	The Presets are restored to the System.
6.	Press the **Eject** button on the keyboard or <**Alt> + E** on the alphanumeric keyboard.	The MO disk is ejected.

Section 4-3
Functional Checks

4-3-1 Basic Controls

4-3-1-1 Alphanumeric Keyboard Test

Table 4-5 Alphanumeric Keyboard Test

Step	Task	Expected Result(s)
1	Power-up the System in Normal Scanning Mode	
2	Press **Config** and select **Report**	
3	Select the **Comment Texts** Tab and press **New**.	
4	Press all Alphanumeric keys one-by-one. To quickly test every key (each letter in the alphabet), type the following sentence: *The quick brown fox jumps over the lazy dog* Repeat the test, while holding down the Shift key.	As each key is pressed, the corresponding letter is typed on the screen.
5	Use the **Backspace** key to delete the text you typed.	

4-3-1-2 Extended Keyboard and Trackball Test

NOTE: The Extended Keyboard and Trackball Test also includes testing of the following components: TGC Sliders, Rotary, Keyboard backlight, Button backlight, and Active Button.
The test can be performed only after Full Shutdown and then (in Maintenance Mode) selecting Production when entering the Diagnostics screen.

4-3-1 Basic Controls (cont'd)

Table 4-6 Extended Keyboard and Trackball Test

Step	Task	Expected Result(s)
1	Power-up the System in Normal Scanning Mode	
2	Press **<Alt> F2** to start the diagnostic package.	
3	Highlight the Extended **Keyboard Test** and press <**Set**>	The Extended Keyboard Test window opens
4	Trackball to **Start** and press **Set.**	The interactive Extended Keyboard Test Screen screen is displayed enabling testing of the various extended keyboard components.
5	Check the **ATCG sliders** as follows: a.) Move one of the ATGC sliders while inspecting the result displayed in the Extended Keyboard Test Screen. b.) Check it is possible to move the slider through its full range. Also, make sure that moving the slider has no influence on any of the other ATGC sliders above or below (i.e., all other sliders remain stationary). c.) Repeat a) and b) to test each of the other ATGC sliders.	As you move the slider, the corresponding position displayed in the Test Screen will be seen to change, accordingly.
6	Check all **Keyboard Keys**, by pressing each in turn as follows: a.) Press one key; make sure the depressed key is shown as *depressed* in the Test Screen. b.) Release the key; make sure the released key is no longer showing as depressed in the Test Screen c.) Repeat a) and b) to test each of the other keyboard keys.	The corresponding key displayed in the Test Screen will be shown as depressed. The corresponding key displayed in the Test Screen will be shown as released.
7	Repeat Step 6 to check the following Trackball buttons: **Zoom**, **Trackball**, **Set**, **Update**, and **Store**.	The corresponding trackball button displayed in the Test Screen will be seen to change, accordingly.
8	Repeat Step 6 to check the **Soft Menu Keys** (each in two directions). Make sure that the corresponding movement is shown in the Test Screen.	The corresponding Soft Menu Key displayed in the Test Screen will be seen to change, accordingly.
9	Repeat Step 6 to check the **Soft Menu Rocker** (in each of four directions). Make sure that the corresponding movement is shown in the Test Screen.	The Soft Menu Rocker displayed in the Test Screen will be seen to change, accordingly.
10	Perform the **Gain Rotary Test**, as follows: a.) When turning the rotary in a *clockwise* direction, each time you hear a click, *right* arrows are displayed in the Test Screen. b.) When turning in a *counter-clockwise* direction, each time you hear a click, *left* arrows are displayed in the Test Screen. Note: When performing this step, make sure that a minimum of 32 clicks are heard when turning the Gain rotary in both the *clockwise* and *counter-clockwise* directions to ensure that a complete check is performed.	The Gain Rotary displayed in the Test Screen will be seen to change, accordingly. The Gain Rotary displayed in the Test Screen will be seen to change, accordingly.

Table 4-6 Extended Keyboard and Trackball Test (cont'd)

Step	Task	Expected Result(s)
11	Check the **On/Off button**: a.) Press the button once; make sure the button is shown as depressed in the Test Screen. b.) Release the button; make sure the button is no longer showing as depressed in the Test Screen.	The On/Off button displayed in the Test Screen will be seen to change, accordingly. The On/Off button displayed in the Test Screen will be seen to change, accordingly.
12	Check the **Lights Control** (Backlights and Active Lights), as follows: a.) trackball to the Active Lights button (under *Lights Control*) and press **Set**. Make sure that all the corresponding LEDs are activated. Alternatively, check each one individually (one-by-one). b.) trackball to the Backlights button (under *Lights Control*) and press **Set**. Make sure that all the extended keyboard backlighting is correctly illuminated.	The corresponding LEDS displayed in the Test Screen will be illuminated green (*Patient*, *CW*, *Application*, *etc*.). The extended keyboard backlighting will be illuminated, accordingly.
13	Trackball to the **Battery Light** button (top *right* of Test Screen) and press **Set**. Make sure that the corresponding LED is activated (illuminates green).	The battery light LED displayed in the Test Screen will be illuminated, accordingly.
14	Trackball to the **Ext DC Light** button (top *right* of Test Screen) and press **Set**. Make sure that the corresponding LED is activated (illuminates green).	The Ext DC light LED displayed in the Test Screen will be illuminated, accordingly.
15	Proceed to perform the Trackball Test, as follows: a.) Move the trackball Note: when the trackball cursor is positioned at the extreme top left of the screen: X = 0 and Y = 0. b.) As you move the trackball cursor, make sure the coordinate values *increase*/*decrease* in small steps, without jumping more than two or three digits. If for example, the values increment by steps of 10, this indicates that the trackball operation is faulty (possibly the trackball requires cleaning, or replacement).	The position of the trackball cursor on the screen is reflected by a change in the displayed X and Y coordinate values.
16	When done with all the above tests, trackball to the **OK** button and press **Set.**	

4-3-1-3 System SN Test

Table 4-7 System SN Test

Step	Task	Expected Result(s)
1	Boot-up the System in Regular Scanning Mode	
2	Press **Config**	
3	Under the **Connectivity** tab, select **TCPIP** then **Computer Name**	
4	Make sure the computer name is System ID	
5	Select **Advanced Settings**	
6	Type **Desktop** and press <**Enter**>	
7	Select **My Computer** and press **Menu**	
8	From the drop-down menu, select **Properties** and then select the **Computer Name** tab.	
9	Make sure the System SN is indicated under the computer description.	The computer description matches the system SN.

4-3-1-4 Speakers Tests

Table 4-8 Speakers Test

Step	Task	Expected Result(s)
	Back End Path:	
1	Boot-up the System in Maintenance Mode	
2	Press **Alt +Config** to start the diagnostic package	
3	From the diagnostic test tree, select **Back End** > **PC Doctor** > **Interactive** > **Audio Test Tree**.	
4	Click **Start**.	
5	At the WAV window, press the **Left Channel** button	Make sure that the *left* internal speaker is working Verify that there is clear sound from all speakers at all frequencies. Note that *right* and *left* are as seen when standing behind the unit.
6	At the WAV window, press the **Right Channel** button	Make sure that the *right* internal speaker is working Verify that there is clear sound from all speakers at all frequencies. Note that *right* and *left* are as seen when standing behind the unit.
7	At the WAV window, press the **Center Channel** button	Make sure that the *Sub woofer* internal speaker is working. Verify that there is clear sound from all speakers at all frequencies. Note that *right* and *left* are as seen when standing behind the unit.
	RFI Path:	
1	From the diagnostic test tree, select **Front End Test** > **RFI**. Then select **RFI Audio Test** and press **Start**.	On completion, the circuitry test will indicate Pass.

4-3-1-5 Light Detector Test for Vivid S6 N only

Table 4-9 Light Detector Test

Step	Task	Expected Result(s)
1	Boot-up the System in Regular Scanning Mode.	
2	Press **LCD (F4 Key)** to start the LCD adjustment.	
3	Rotate the Brightness, Contrast and Blue Tint to max values.	LCD adjustment will change; the status bar for each of the three parameters will move to the max position.
4	Select **AutoAdjust** on the softkey menu.	The Screen will change Brightness, Contrast and Tint parameters to in accordance with the environmental lighting.

4-3-1-6 Monitor Test

This procedure is performed in stages, in the order shown in the table below. First, verify the monitor settings and then proceed with the tests that follow.

Table 4-10 Monitor Test

Step	Task	Expected Result(s)
	VERIFY MONITOR SETTINGS	
1	Boot-up the System in Regular Scanning Mode	
2	Press **Config**	
3	Under the **Connectivity** tab, select **TCPIP**	
4	Select **Advanced**	
5	In the address bar, type **Control panel** and press **Enter**	
6	From the Control Panel, select **Display** then select **Settings**	Make sure resolution is set to 800 x 600 pixels, 16 bit. If not, select the correct resolution settings.
7	From the **Settings** Tab, select **Advanced**. Select **Intel® Extreme Graphics2 for mobile** > **Graphics Properties** > **Video Overlay**.	Make sure the settings are: • Gamma = 0 • Contrast = 50 • Saturation = 50 • Brightness = 7 • Contrast = 1
8	When done, press **OK** to close all windows.	
	LCD PIXEL TEST:	
1	Boot-up the System in Maintenance Mode	
2	Press **Alt +Config** to start the diagnostic package	
3	From the Diagnostic Test Tree, select **Back End**. This will activate PC Doctor diagnostics.	
4	Run the **System Diagnostics\Monitor Test.**	

Table 4-10 Monitor Test (cont'd)

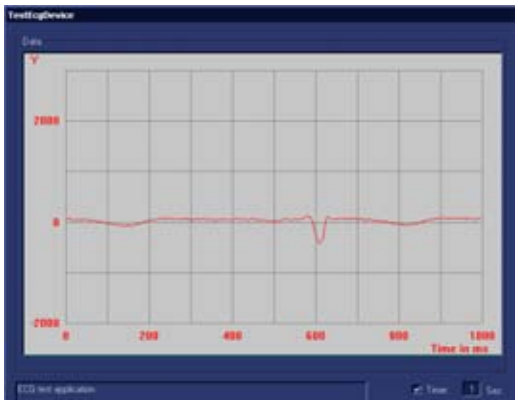
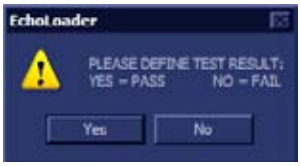
Step	Task	Expected Result(s)
5	Select **Solid Test**.	Not more than 1 missing pixel in R/G/B tests
6	Select **Red**	Make sure there are no more than 1 missing pixel in the Full Screen Red or display in another color.
7	Select **Green**	Make sure there are no more than 1 missing pixel in the Full Screen Green or display in another color.
8	Select **Blue**	Make sure there are no more than 1 missing pixel in the Full Screen Blue or display in another color.
9	When done, press **Close** The system will prompt: Did the test pass? Respond accordingly.	
	EXTERNAL MONITOR TEST:	
1	Connect the external monitor to the system.	
2	Boot-up the System in *Maintenance Mode*.	
3	Press **Alt +Config** to start the diagnostic package,	
4	From the diagnostic test tree, select **Back End**. This will activate PC Doctor diagnostics.	
5	Run **System Diagnostics\Monitor Test**	
6	Select **Combination Test**.	
7	Follow the on-screen instructions.	PASS
8	When done, press **Close.** The system will prompt that the test passed.	

4-3-1-7 ECG Test

Table 4-11 ECG Test

Step	Task	Expected Result(s)
1	Boot-up the System in Maintenance Mode	
2	Connect the ECG cable to the input on the ECG port on the right side of the scanner. Connect the ECG leads to yourself (as the simulated patient).	
3	Press **Alt + Config** to enter into Diagnostics Mode	
4	From the Diagnostic Test tree, select **Back End**.	
5	Run the **ECG Test.**	

Table 4-11 ECG Test (cont'd)

Step	Task	Expected Result(s)
6	From the Test ECG device window, set the resolution to 1 second and press the **Open Device** button.	The ECG signal is displayed in the Data area, as shown in the example below: 
7	Verify that a single clear QRS signal is displayed.	
8	When done, trackball to the **Exit** button and press **Set**.	
9	When prompted by the following message, select **Yes** or **No** as applicable. 	
9	Press the <**Esc**> button on the keyboard to close the Diagnostic Test window.	

4-3-1-8 Front End Tests

Table 4-12 Front End Tests

Step	Task	Expected Result(s)
1	In order to access an individual board test, it is necessary to insert the service dongle from system boot-up and enter the Service Password.	
2	Press **Alt + Config** to enter Diagnostics Mode	

Table 4-12 Front End Tests (cont'd)

Step	Task	Expected Result(s)
3	From the Diagnostic Test tree, select **Front End Tes**t, then proceed to perform the tests described below.	For each test, as the testing sequence progresses, the progress bar will advance to reflect the test progress. Status indicators in the Data Flow map corresponding to the various system components will be highlighted in the appropriate color to indicate the current test status, as follows: **Green:** All recommended tests for these components have been completed and no problems were identified. **Red:** Problems were identified in these components during the performance of the test. **Yellow:** The tests executed so far on these components have passed, but not all recommended tests have been performed.
	Note: When performing Front End tests, if the system must be re-booted, do so. Continue testing from the point at which you were required to reboot. If a failure occurs, re-boot the system and test again to verify the outcome of the test	
	DC OFFSET CALIBRATION TEST	
1	Trackball to **DC Offset Calibration** and press **Set**.	
2	Disconnect any probes currently connected to the system and make sure that nothing is touching the probe connectors.	
3	Under the *Special Instructions* area, activate the **Loops** checkbox and select the required number of *Loops* from the combo box.	
4	Adjacent to *On Fail,* select either **Stop** or **Continue**, as required.	
5	Trackball to the **Start** button and press **Set**	The test commences. When the DC Offset Calibration Test sequence is complete, the View Test Log window opens automatically, listing the test performed and showing whether it passed or failed - see the example in Figure 7-7 on page 7-26
6	Use the scroll arrows at the bottom of the Reports window to scroll through the channels and view the corresponding results.	
7	When done, trackball to the **Close** button and press **Set**	
	DC OFFSET VERIFICATION TEST	
1	Trackball to **DC Offset Verification** and press **Set**.	
2	Disconnect any probes currently connected to the system and make sure that nothing is touching the probe connectors.	
3	Under the *Special Instructions* area, activate the **Loops** checkbox and select the required number of *Loops* from the combo box.	

Table 4-12 Front End Tests (cont'd)

Step	Task	Expected Result(s)
4	Adjacent to *On Fail,* select either **Stop** or **Continue**, as required.	
5	Trackball to the **Start** button and press **Set**	The test commences. When the DC Offset Verification Test sequence is complete, the View Test Log window opens automatically, listing the test performed and showing whether it passed or failed - see the example in Figure 7-9 on page 7-28.
6	Use the scroll arrows at the bottom of the Reports window to scroll through the channels and view the corresponding results.	
	FULL RFI TEST	
	Note: For the Full RFI test, four tests are performed in the test sequence; these are listed in the Tests window. For each currently-selected test (for example, *RFI FE Cache Test*) the corresponding report is listed in Reports on the right.	
1	Trackball to **Full RFI Test** and press **Set**.	
2	Disconnect any probes currently connected to the system and make sure that nothing is touching the probe connectors.	
3	Under the *Special Instructions* area, activate the **Loops** checkbox and select the required number of *Loops* from the combo box.	
4	Adjacent to *On Fail,* select either **Stop** or **Continue**, as required.	
5	Trackball to the **Start** button and press **Set**	The test commences. When the Full RFI Test sequence is complete, the View Test Log window opens automatically, listing the test performed and showing whether it passed or failed - see the example in Figure 7-10 on page 7-30.
6	Use the scroll arrows at the bottom of the Reports window to scroll through the channels and view the corresponding results.	For details of each report, refer to the following for explanations: - "View Test Log - RFI Cache Test" on page 34 - "View Test Log - RFI Demodulator Short Test" on page 40 - "View Test Log - RFI Analog Circuits Test" on page 37 - "View Test Log - RFI Audio Test" on page 43
	BEAMFORMER TESTS	
	TR32 BF Digital Test	
1	Trackball to **TR32 BF Digital Test** and press **Set**.	
2	Disconnect any probes currently connected to the system and make sure that nothing is touching the probe connectors.	

Table 4-12 Front End Tests (cont'd)

Step	Task	Expected Result(s)
3	Under the *Special Instructions* area, activate the **Loops** checkbox and select the required number of *Loops* from the combo box.	
4	Adjacent to *On Fail,* select either **Stop** or **Continue**, as required.	
5	Trackball to the **Start** button and press **Set**	The test commences. When the TR32 BF Digital Test sequence is complete, the View Test Log window opens automatically, listing the test performed and showing whether it passed or failed - see the examples in Figure 7-21 on page 7-45 and Figure 7-22 on page 7-46.
6	Use the scroll arrows at the bottom of the Reports window to scroll through the channels and view the corresponding results.	
	System BF Digital Test	
1	Trackball to **System BF Digital Test** and press **Set**.	
2	Disconnect any probes currently connected to the system and make sure that nothing is touching the probe connectors.	
3	Under the *Special Instructions* area, activate the **Loops** checkbox and select the required number of *Loops* from the combo box.	
4	Adjacent to *On Fail,* select either **Stop** or **Continue**, as required.	
5	Trackball to the **Start** button and press **Set**	The test commences. When the System BF Digital Test sequence is complete, the View Test Log window opens automatically, listing the test performed and showing whether it passed or failed - see the examples in Figure 7-24 on page 7-48 and Figure 7-25 on page 7-49.
6	Use the scroll arrows at the bottom of the Reports window to scroll through the channels and view the corresponding results.	
	ADC Test	
1	Trackball to **ADC Test** and press **Set**.	
2	Disconnect any probes currently connected to the system and make sure that nothing is touching the probe connectors.	
3	Under the *Special Instructions* area, activate the **Loops** checkbox and select the required number of *Loops* from the combo box.	
4	Adjacent to *On Fail,* select either **Stop** or **Continue**, as required.	

Table 4-12 Front End Tests (cont'd)

Step	Task	Expected Result(s)
5	Trackball to the **Start** button and press **Set**	The test commences. When the ADC Test sequence is complete, the View Test Log window opens automatically, listing the test performed and showing whether it passed or failed - see the examples in Figure 7-27 on page 7-51 and Figure 7-28 on page 7-52.
6	Use the scroll arrows at the bottom of the Reports window to scroll through the channels and view the corresponding results.	
	RX TEST	
1	Trackball to **RX Test** and press **Set**.	
2	Disconnect any probes currently connected to the system and make sure that nothing is touching the probe connectors.	
3	Under the *Special Instructions* area, activate the **Loops** checkbox and select the required number of *Loops* from the combo box.	
4	Adjacent to *On Fail,* select either **Stop** or **Continue**, as required.	
5	Trackball to the **Start** button and press **Set**	The test commences. When the RX Test sequence is complete, the View Test Log window opens automatically, listing the test performed and showing whether it passed or failed - see the examples in Figure 7-32 on page 7-56 and Figure 7-33 on page 7-57.
6	Use the scroll arrows at the bottom of the Reports window to scroll through the channels and view the corresponding results.	
	ACW TESTS	
	ACW IQ Symmetry Test	
1	Trackball to **ACW IQ Symmetry Test** and press **Set**.	
2	Disconnect any probes currently connected to the system and make sure that nothing is touching the probe connectors.	
3	Under the *Special Instructions* area, activate the **Loops** checkbox and select the required number of *Loops* from the combo box.	
4	Adjacent to *On Fail,* select either **Stop** or **Continue**, as required.	
5	Trackball to the **Start** button and press **Set**	The test commences. When the ACW IQ Symmetry Test sequence is complete, the View Test Log window opens automatically, listing the test performed and showing whether it passed or failed - see the example in Figure 7-35 on page 7-62.

Table 4-12 Front End Tests (cont'd)

Step	Task	Expected Result(s)
6	Use the scroll arrows at the bottom of the Reports window to scroll through the channels and view the corresponding results.	
	ACW Matrix Test	
1	Trackball to **ACW Matrix Test** and press **Set**.	
2	Disconnect any probes currently connected to the system and make sure that nothing is touching the probe connectors.	
3	Under the *Special Instructions* area, activate the **Loops** checkbox and select the required number of *Loops* from the combo box.	
4	Adjacent to *On Fail,* select either **Stop** or **Continue**, as required.	
5	Trackball to the **Start** button and press **Set**	The test commences. When the ACW Matrix Test sequence is complete, the View Test Log window opens automatically, listing the test performed and showing whether it passed or failed - see the examples in Figure 7-37 on page 7-64 and Figure 7-38 on page 7-66.
6	Use the scroll arrows at the bottom of the Reports window to scroll through the channels and view the corresponding results.	

Table 4-12 Front End Tests (cont'd)

Step	Task	Expected Result(s)
	ACW Delay Range Test	
1	Trackball to **ACW Delay Range Test** and press **Set**.	
2	Disconnect any probes currently connected to the system and make sure that nothing is touching the probe connectors.	
3	Under the *Special Instructions* area, activate the **Loops** checkbox and select the required number of *Loops* from the combo box.	
4	Adjacent to *On Fail,* select either **Stop** or **Continue**, as required.	
5	Trackball to the **Start** button and press **Set**	The test commences. When the ACW Delay Range Test sequence is complete, the View Test Log window opens automatically, listing the test performed and showing whether it passed or failed - see the examples in Figure 7-41 on page 7-69 through Figure 7-43 on page 7-71.
6	Use the scroll arrows at the bottom of the Reports window to scroll through the channels and view the corresponding results.	
	ACW Pre-Mixer Gain Test	
1	Trackball to **ACW Pre-Mixer Gain Test** and press **Set**.	
2	Disconnect any probes currently connected to the system and make sure that nothing is touching the probe connectors.	
3	Under the *Special Instructions* area, activate the **Loops** checkbox and select the required number of *Loops* from the combo box.	
4	Adjacent to *On Fail,* select either **Stop** or **Continue**, as required.	
5	Trackball to the **Start** button and press **Set**	The test commences. When the ACW Pre-Mixer Gain Test sequence is complete, the View Test Log window opens automatically, listing the test performed and showing whether it passed or failed - see the example in Figure 7-45 on page 7-73.
6	Use the scroll arrows at the bottom of the Reports window to scroll through the channels and view the corresponding results.	
	ACW BPF Test	
1	Trackball to **ACW BPF Test** and press **Set**.	
2	Disconnect any probes currently connected to the system and make sure that nothing is touching the probe connectors.	

Table 4-12 Front End Tests (cont'd)

Step	Task	Expected Result(s)
3	Under the *Special Instructions* area, activate the **Loops** checkbox and select the required number of *Loops* from the combo box.	
4	Adjacent to *On Fail,* select either **Stop** or **Continue**, as required.	
5	Trackball to the **Start** button and press **Set**	The test commences. When the ACW BPF Test sequence is complete, the View Test Log window opens automatically, listing the test performed and showing whether it passed or failed - see the examples in Figure 7-47 on page 7-76 through Figure 7-50 on page 7-79.
6	Use the scroll arrows at the bottom of the Reports window to scroll through the channels and view the corresponding results.	
	ACW HPF Test	
1	Trackball to **ACW HPF Test** and press **Set**.	
2	Disconnect any probes currently connected to the system and make sure that nothing is touching the probe connectors.	
3	Under the *Special Instructions* area, activate the **Loops** checkbox and select the required number of *Loops* from the combo box.	
4	Adjacent to *On Fail,* select either **Stop** or **Continue**, as required.	
5	Trackball to the **Start** button and press **Set**	The test commences. When the ACW HPF Test sequence is complete, the View Test Log window opens automatically, listing the test performed and showing whether it passed or failed - see the examples in Figure 7-52 on page 7-81 and Figure 7-53 on page 7-82.
6	Use the scroll arrows at the bottom of the Reports window to scroll through the channels and view the corresponding results.	
	PENCIL RX TEST	
	Important: When performing this test, no probe should be connected to the system and nothing should be touching the probe connectors!	
1	Trackball to **PENCIL RX Test** and press **Set**.	
2	Disconnect any probes currently connected to the system and make sure that nothing is touching the probe connectors.	
3	Under the *Special Instructions* area, activate the **Loops** checkbox and select the required number of *Loops* from the combo box.	
4	Adjacent to *On Fail,* select either **Stop** or **Continue**, as required.	

Table 4-12 Front End Tests (cont'd)

Step	Task	Expected Result(s)
5	Trackball to the **Start** button and press **Set**	The test commences. When the PENCIL RX Test sequence is complete, the View Test Log window opens automatically, listing the test performed and showing whether it passed or failed - see the example in Figure 7-55 on page 7-84.
6	Use the scroll arrows at the bottom of the Reports window to scroll through the channels and view the corresponding results.	

4-3-1-9 Visual Test

Table 4-13 Visual Test

Step	Task	Expected Result(s)
1	Connect the 3S-RS probe.	
2	Increase the gain to see the homogenous noise.	The probe ID is 3S-RS. No strikes or artefacts are present.

4-3-2 Peripherals

4-3-2-1 B/W and Color Printer Test

NOTE: If the printer is not currently connected to the system, refer to "Connecting the Black & White Printer" on page 24, or "Connecting the DeskJet Color Printer" on page 39 for configuration instructions, as applicable.

Table 4-14 B/W and Color Printer Test

Step	Task	Expected Result(s)
1	Scan a phantom or suitable interface in 2D-Mode.	
2	Press the **Freeze** button.	The image scanning stops with the latest picture frozen on the screen.
3	Press the **Print** button.	Evaluate the print quality. Adjust the *brightness* and/or *contrast* of the B/W printer, if required. The image displayed on the screen is printed on the B/W or color printer, depending upon the key assignment configuration (refer to
1	Scan a blood vessel in 2D-Mode or a phantom simulating a similar CFM effect, then activate CFM to see color.	
2	Press the **Freeze** button.	
3	Press the **P1** button.	Evaluate the color print quality. Adjust the *brightness* and/or *contrast* of the Color printer, if required.

4-3-2-2 Color Printer Test

NOTE: If the printer is not currently connected to the system, refer to "Connecting the DeskJet Color Printer" on page 39 for configuration instructions.

Table 4-15 Color Printer Test

Step	Task	Expected Result(s)
1	Scan blood vessels in 2D-Mode or a phantom simulating a similar CFM effect, then activate CFM to see color.	
2	Press the **Freeze** button.	
3	Press the **P2** button.	Evaluate the color print quality. Adjust the *brightness* and/or *contrast* of the Color printer, if required.

4-3-3 Mechanical Functional Tests

4-3-3-1 Arm Movement Test

Table 4-16 Arm Movement Test

Step	Task	Expected Result(s)
1	Lift the up/down release handle *upwards.* (It is located on the *right* side below the operator panel).	The *up and down* movement locking mechanism is released, allowing the arm to be raised or lowered.
2	While lifting the release handle, raise the operator panel *upwards*, then *downwards* and make sure it is able to reach its maximum lowest and maximum highest positions.	Ensure that you do not apply too much force to move the operator panel and that the movement is smooth. Ensure that you do not apply too much force to move the release handle and that the movement is smooth. During the movement up and down make sure the image displayed on the monitor does not present any disturbance.
3	Release the up/down handle.	Make sure the arm is locked and no movement is observed when moderate force is applied to the operator panel (*upwards* and *downwards*).

4-3-3-2 Operator Panel Movement Test

Table 4-17 Operator Panel Movement Test

Step	Task	Expected Result(s)
1	Lift the left/right release handle located on the *left* side of the Operator Panel.	The *left and right* movement locking mechanism is released, allowing the Operator Panel to be swiveled 30 degrees to the right and left from the center position.
2	While lifting the release handle, swivel the operator panel left and right and make sure it is able to reach its maximum left and maximum right positions.	Ensure that you do not apply too much force to move the operator panel and that the movement is smooth. Ensure that you do not apply too much force to move the release handle and that the movement is smooth. During the movement up and down make sure image displayed on monitor does not present any disturbance.
3	Release the left/right handle.	Make sure Operator Panel is locked and no movement is observed when moderate force is applied to the operator panel (*left* and *right*).

4-3-3-3 Monitor Movement Test

Table 4-18 Main Shelf Movement Test

Step	Task	Expected Result(s)
1	Tilt the monitor *forwards* and *backwards*.	Ensure that you do apply some force to move the monitor. During movement some friction should felt. During the movement, make sure the image displayed on the monitor does not present any disturbance.
2	Tilt the monitor sideways - *left* and *right*.	Ensure that you do apply some force to move the monitor. During movement some friction should felt. During the movement, make sure the image displayed on the monitor does not present any disturbance.

4-3-3-4 Front Wheel Function Test

Table 4-19 Brakes Function Test (Front Castor Wheels)

Step	Task	Expected Result(s)
1	Release the wheel lock (upper lever) on each front castor wheel by pushing the lever labeled OFF. Push and pull the unit *right*, *left*, *backwards* and *forwards*.	Ensure that the wheels move freely in all directions. Check the wheels for wear and tear, and replace if necessary.
2	Press the foot brake (lower lever) *down* on each front castor wheel to lock the wheels in position. Push and pull the unit *right*, *left*, *backwards* and *forwards*.	Ensure that the wheels are locked and there is no movement in any direction.

4-3-3-5 Rear Wheel Function Test

Table 4-20 Brakes Function Test (Rear Castor Wheels)

Step	Task	Expected Result(s)
1	Release the wheel lock (upper lever) on each rear castor wheel by pushing the lever labeled OFF. Push and pull the unit *right*, *left*, *backwards* and *forwards*.	Ensure that the wheels move freely in all directions. Check the wheels for wear and tear, and replace if necessary.
2	Press the foot brake (lower lever) *down* on each rear castor wheel to lock the wheels swivel. Push and pull the unit *right*, *left*, *backwards* and *forwards*.	Ensure that the wheels are locked and that there is no swiveling left or right and no movement forwards or backwards.

4-3-4 Back End Processor Tests

4-3-4-1 USB Test

Table 4-21 Scanner USB Functional Test

Step	Task	Expected Result(s)
1	Plug the service dongle (Technical Support plug) into one of the USB ports on the Operator panel, or on the rear.	
2	Turn ON the Vivid S5 N or Vivid S6 N scanner.	The red LED on the service dongle illuminates.
3	Move the service dongle between each of the four USB ports in turn, checking that the LED illuminates correctly.	The red LED on the service dongle illuminates.

4-3-4-2 Standby Test

Table 4-22 Standby Test

	Task	Expected Result(s)
1	Press the **On/Off** button on the control console for no more than 3 seconds and select **Standby**.	The system enters *Standby* mode.
2	Turn OFF the system's circuit breaker.	The system remains in *Standby* mode, indicated by the **On/Off** button LED.
3	Turn ON the system's circuit breaker. Press the **On/Off** Button.	The system returns quickly to the *Power-ON* state - less than 30 seconds.
4	Turn OFF the system's circuit breaker. Press the On/Off button for 1 sec. The system enters *Standby* mode. Turn ON the system's circuit breaker.	The system enters *Standby* mode and stays in this mode. The **On/Off** button LED is steadily illuminated.
5	Turn OFF the system's circuit breaker. Press the **On/Off** button for 8 secs.	The system enters the *Power-OFF* state. The **On/Off** button LED is OFF.

Section 4-4
System Turnover Checklist

Before returning the Vivid S5 N or Vivid S6 N ultrasound scanner to regular operational use, the System Configuration settings should be checked. In 2D-Mode, press **Config** on the keyboard and check the settings in accordance with those listed or referenced in Table 4-23 "Software Configuration Checklist" on page 4-36

4-4-1 Software Configuration Checks

Table 4-23 Software Configuration Checklist

Step	Task	Check
1	Check the date and time settings. Refer to “Date and Time Adjustments” on page 63.	
2	Check the language settings.Refer to “Language Selection” on page 64.	
3	Ensure that all of the software options are configured correctly. Refer to “Software Options Configuration” on page 76.	
4	Ensure that the hospital details are configured correctly. Refer to Table 3-10 on page 62.	
6	Ensure that the measurement units are configured as required for the specific site and country.Refer to “Units of Measure” on page 65.	
7	Ensure that the connectivity network settings have not been modified and are configured as required for the specific site. Refer to “Set the Scanner’s Network Information” on page 88.	

Section 4-5
Site Log

Table 4-1: Vivid S5 N and Vivid S6 N Site Log

Date	Service Person	Problem	Comments

Table 4-1: Vivid S5 N and Vivid S6 N Site Log (cont'd)

Date	Service Person	Problem	Comments

Chapter 5
Components and Function (Theory)

Section 5-1
Overview

5-1-1 Purpose of Chapter 5

This chapter explains Vivid S5 N and Vivid S6 N system concepts, component arrangement, and sub-system functions. It also describes the power distribution system, the cabling system and probes.

Table 5-1 Contents in Chapter 5

Section	Description	Page Number
5-1	Overview	5-1
5-2	General Information	5-1
5-3	Front End Unit	5-5
5-4	Back End Processor	5-22
5-5	Internal and External Input/Output (I/O)	5-30
5-6	Power Supply System	5-36
5-7	Top Console with Monitor and Operator Panel	5-42
5-8	ECG Module	5-47
5-9	Peripherals	5-49
5-10	Cooling System	5-51
5-11	Common Service Platform	5-52

Section 5-2
General Information

The Vivid S5 N and Vivid S6 N systems are compact ultrasound scanners that can be used with both phased array and linear array ultrasound probes and Doppler (Pedof) probes.

Weighing only 70 kg (154 lb), each system is extremely versatile and - depending upon the installed software - can be used for various imaging modes, such as:

- 2D Gray Scale and 2D Color Flow imaging
- M-Mode Gray Scale imaging
- Color M-Mode
- Doppler
- Different combinations of the above modes

5-2-1 Introduction

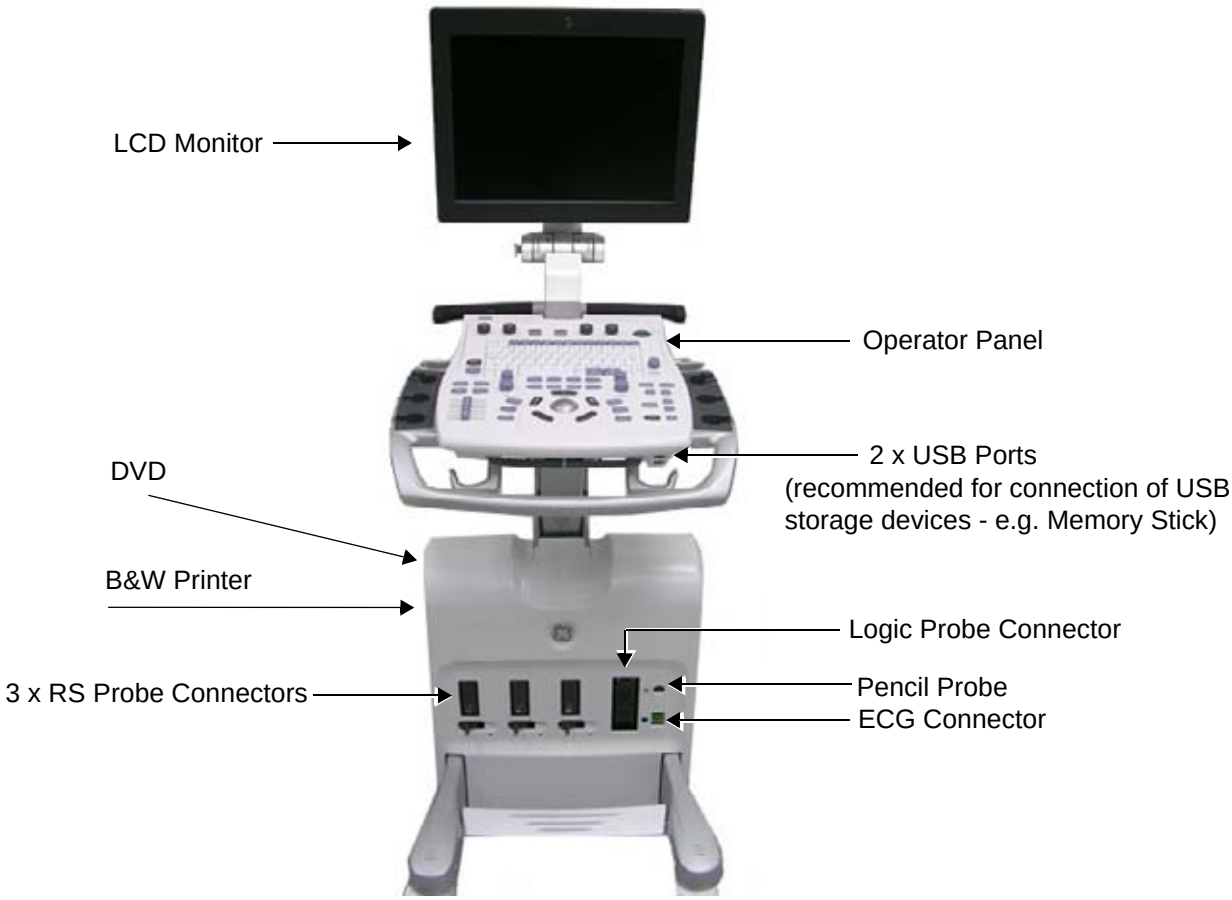


Figure 5-1 System - View from Front

The Vivid S5 N and Vivid S6 N systems are equipped with a highly efficient power supply, resulting in low power consumption and minimal acoustical noise. Among other significant features are the following:

- Integrated, low-power Front End (uses advanced ASIC and FGPA technologies).
- Open connectivity using multiple USB ports
- High-performance LCD monitor, with fully-adjustable contrast and viewing angle (Vivid S6 N systems: 17" display; Vivid S5 N systems: 15" display)
- Low profile, backlit keyboard

Vivid S5 N and Vivid S6 N have a digital beam forming system (incorporated in the Front End) that can handle up to 192 element linear probes using multiplexing.

Signals flow from the Probe Connector Panel, to the Front End (FE) Electronics, to the Back End Processor (BEP), and finally are displayed on the monitor and peripherals.

In addition, the Vivid S5 N and Vivid S6 N systems enable acquisition of the following signals: ECG, and external ECG. The ECG module, which supports acquisition of three bipolar ECG channels (leads I, II, III), is incorporated in the cabinet cage assembly to provide ECG signals to synchronize cardiac ultrasound image acquisition. Additionally, other analog inputs from devices such as treadmills are processed.

5-2-2 Signal Flow

The two TR32 Boards in the Front-End Processor generate the strong bursts transmitted by the probes as ultrasound into the body. The Transmit bursts are routed from the TR32 Boards via the Probe Interface Board (PIB), then to the Probe Selection Board (PSB) via PIB-to-PSB flex where the ultrasound probes are connected.

Weak ultrasound echoes from blood cells and body structure are received by the probes and routed via the Probe Selection Board, the PIB-to-PSB flex and the Probe Interface Boards back to the TR32 Boards. The TR32 Boards amplify these signals, convert them to a digital signal and do the beam forming.

The vector data streams (one per each MLA) generated by the Beam Former are routed to the RFI Board for further processing by the Demodulator FPGA and DSP and then the signals are transferred via the PCI bus to the Back-End Processor where they are converted to video. The video signals are connected to the Distribution Interface Board (DIB) from where they are routed to the internal monitor, to the external monitor, and to the Digital Video Recorder (DVR).

5-2-2-1 System Configuration and Software

System configuration is stored on a hard disk drive inside the Back-End Processor.

At power up, all necessary software is loaded from the hard disk.

5-2-2-2 Operator Panel

The user initiates system operations via the Operator Panel that has ultrasound-specific buttons, mode-dependent softkey buttons and an alphanumeric keyboard.

5-2-2-3 Electronics

Vivid S5 N and Vivid S6 N internal electronics are divided into three:

- Front End (FE) Processor
- Back End Processor (BEP)
- Power Distribution System

For both Vivid S5 N and Vivid S6 N systems, internal electronics comprise a single card cage that contains both the FEP and the BEP. The Interconnecting signals and power distribution between the two sections are routed internally via cables. All the interconnections to the monitors, operator keyboard and peripherals are via the Distribution Interface Board (DIB) which is fully shielded for EMC/EMI purposes.

The main functional blocks in the Vivid S5 N and Vivid S6 N systems are listed below, and described in detail in this chapter, as follows:

- Front End (FE) Processor - see Section 5-3 "Front End Unit" on page 5-5
- Back End Processor (BEP) - see Section 5-4 "Back End Processor" on page 5-22
- Internal and external cable interconnections - see Section 5-5 "Internal and External Input/Output (I/O)" on page 5-30
- Monitor & Keyboard - see Section 5-7 "Top Console with Monitor and Operator Panel" on page 5-42
- Power Supply System - see Section 5-6 "Power Supply System" on page 5-36
- Peripherals - see Section 5-9 "Peripherals" on page 5-49

For a detailed block diagram of the Vivid S5 N and Vivid S6 N system, refer to Figure 5-2 "System Block Diagram" on page 5-4.

5-2-3 Vivid S5 N and Vivid S6 N Systems - Block Diagram

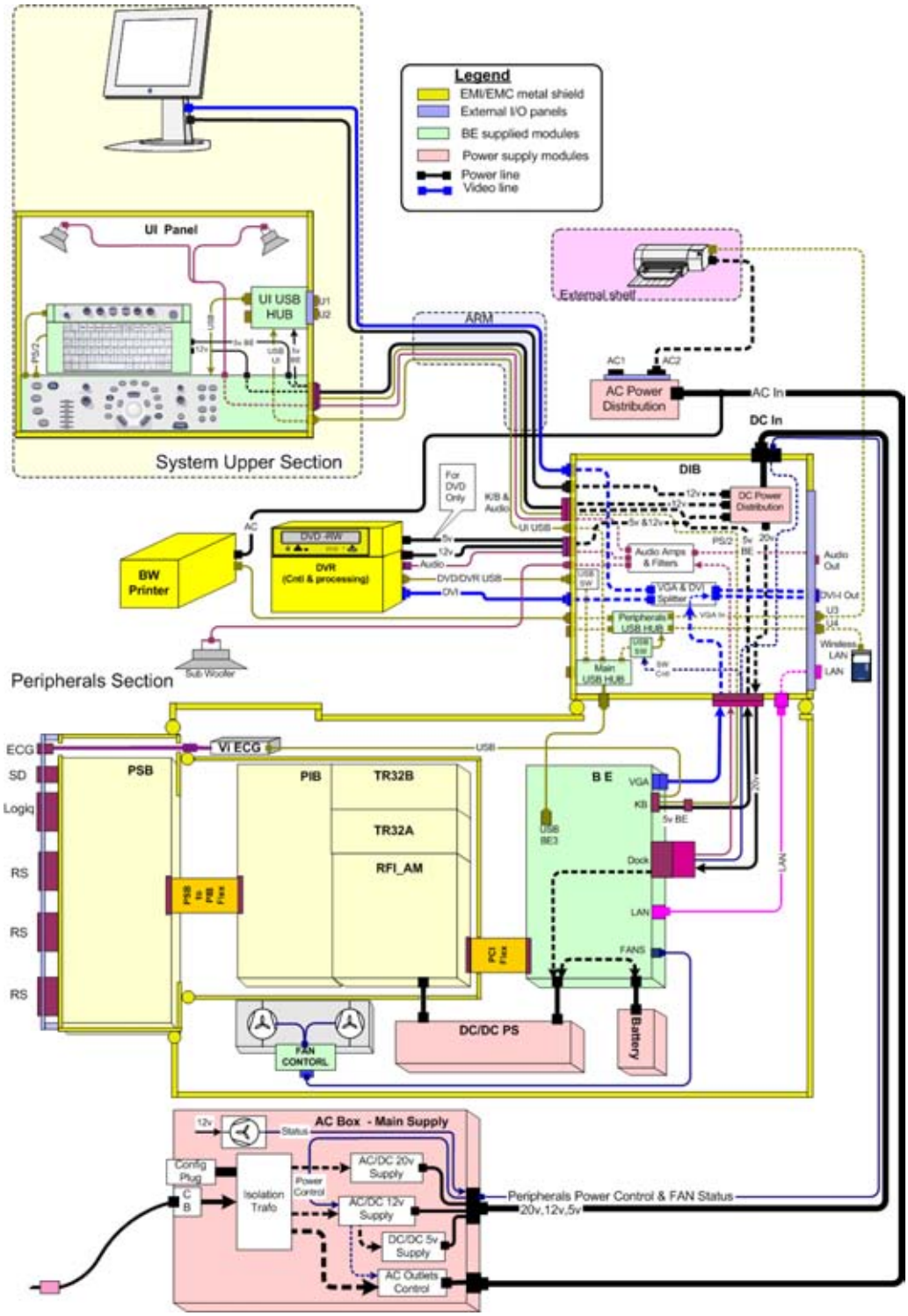


Figure 5-2 System Block Diagram

Section 5-3
Front End Unit

5-3-1 General Information

The Vivid S5 N and Vivid S6 N Front End system (see diagram in Figure 5-4 "Front End - Block Diagram" on page 5-7) can be divided into two subsystems:

1.) Scanner Subsystem

Includes the following:

- RFI_AM Board (Scan Controller and tissue processing)
  For a detailed description, see 5-3-3 "RFI_AM Board" on page 5-10.

2.) Front End Subsystem

Includes the following:

- Two TR32 Boards (each board includes a 32-channel digital Beamformer)
  For a detailed description, see 5-3-4 "TR32 Boards (Transmitter/Receiver)" on page 5-14.
- PSB (Probe Select Board) - includes HVMUX
  For a detailed description, see 5-3-5 "Probe Select Board (PSB)" on page 5-17.
- PIB (Probe Interface Board)
  For a detailed description, see 5-3-6 "Probe Interface Board (PIB)" on page 5-19.

Section 5-3 Front End Unit (cont'd)

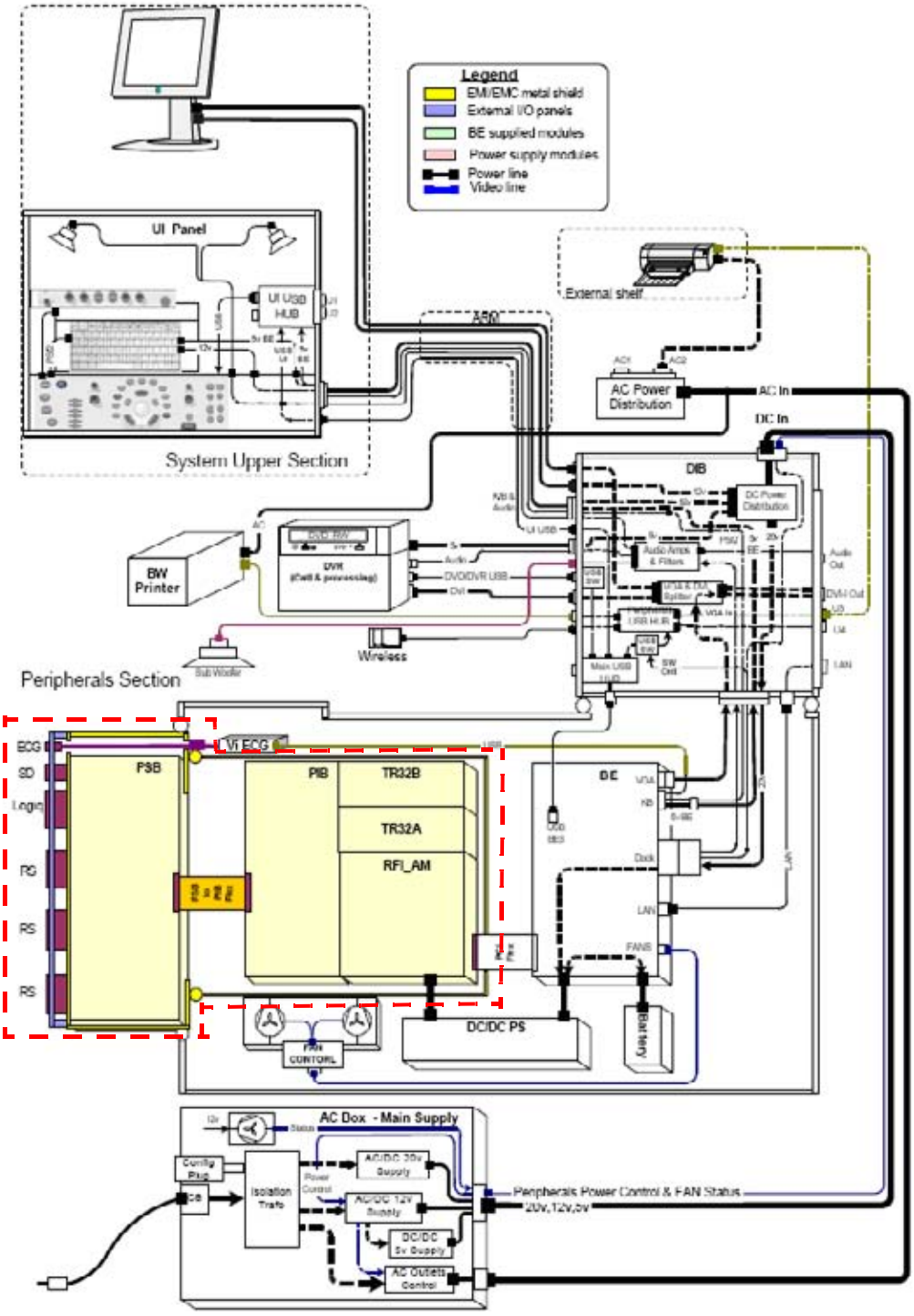


Figure 5-3 System Block Diagram showing Location of Front End

Section 5-3 Front End Unit (cont'd)

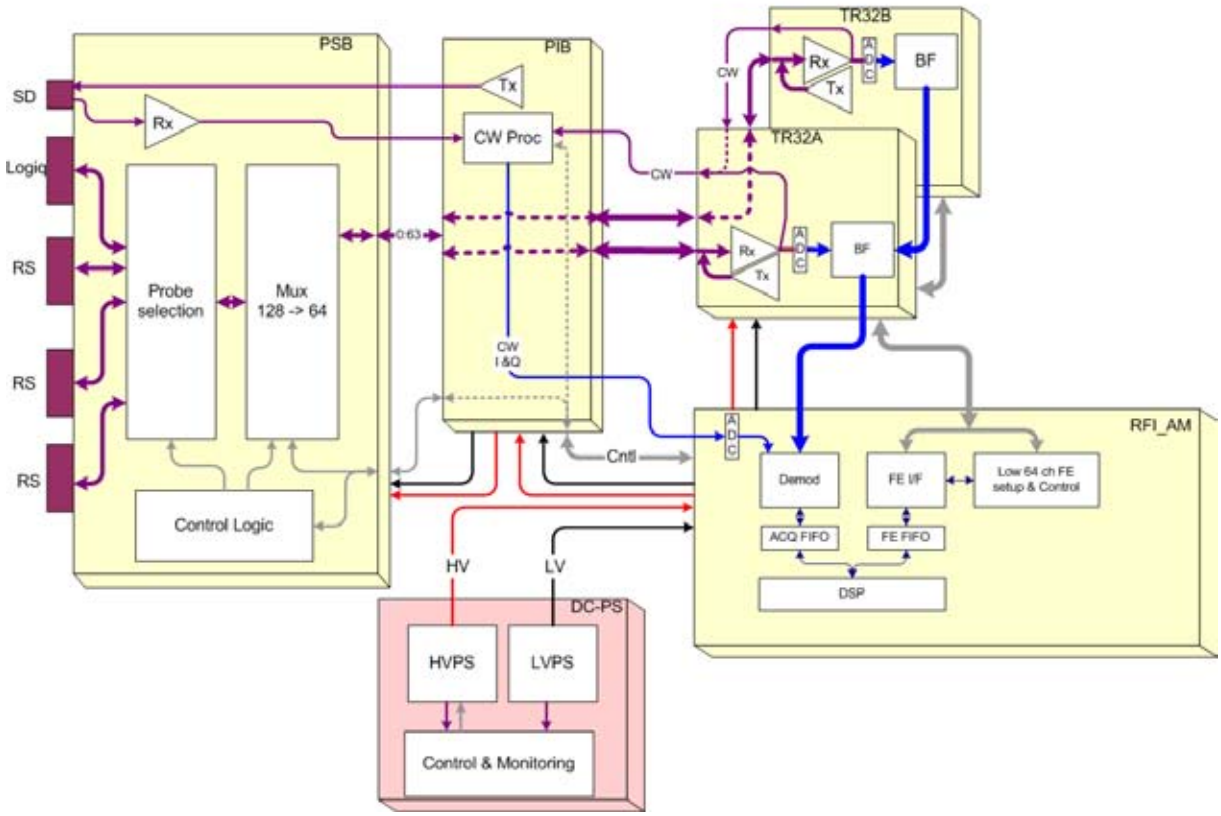


Figure 5-4 Front End - Block Diagram

5-3-2 Front End Unit - Location in the System

The Front End unit is located inside the cabinet cage assembly - see Figure 5-5 "Cabinet Cage Assembly" on page 5-8.

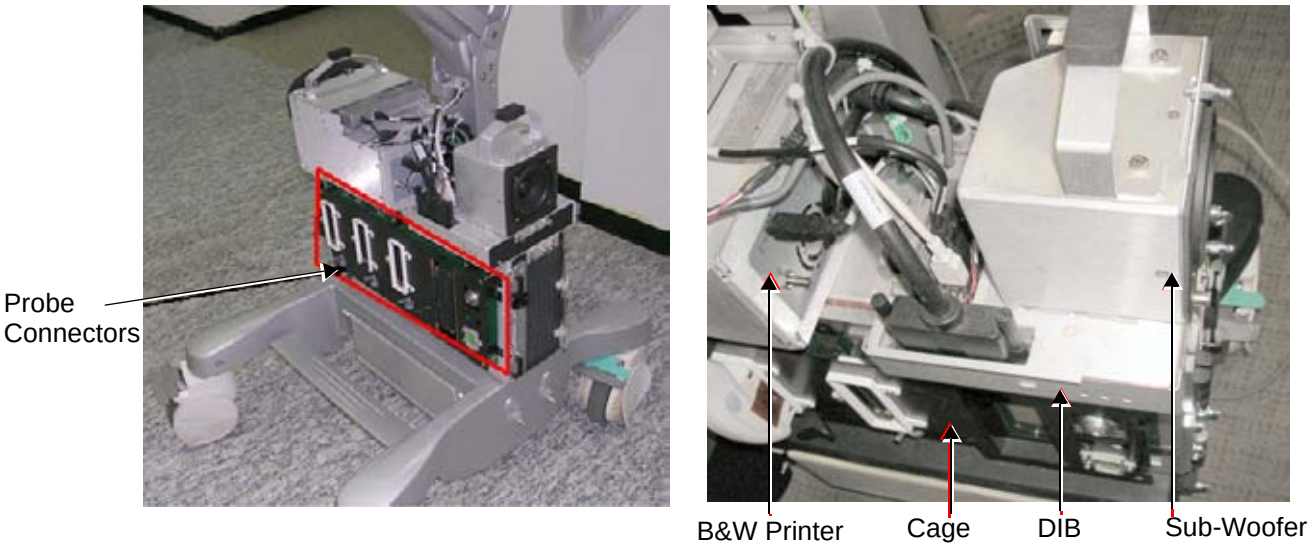


Figure 5-5 Cabinet Cage Assembly

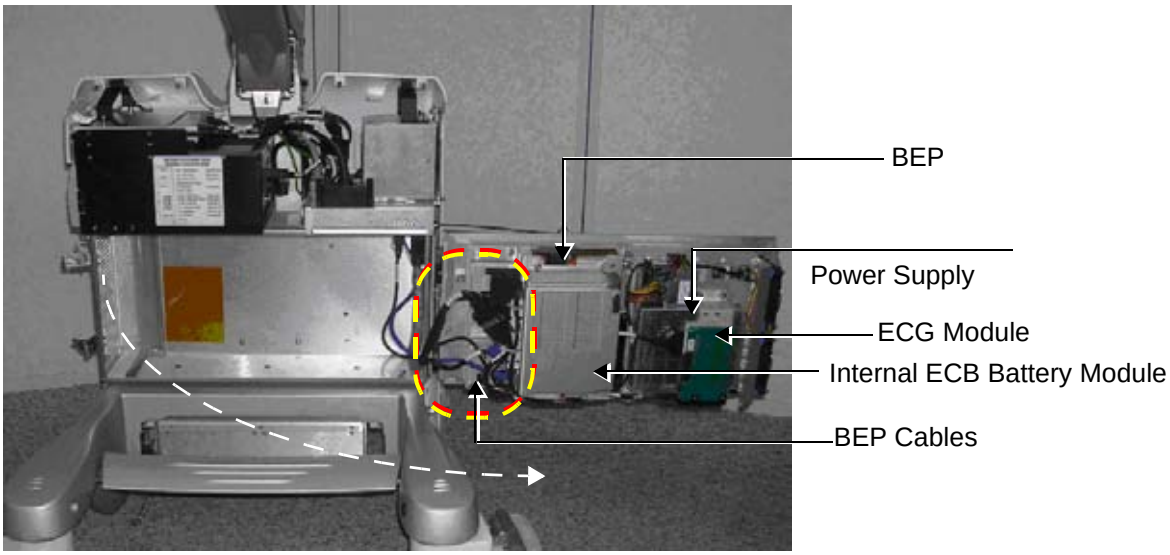


Figure 5-6 Cabinet Cage Assembly in Opened Position

⚠ **WARNING** **When opening and closing the Cabinet Cage Assembly, take care not to damage the cables connected to the BEP (indicated in Figure 5-6 "Cabinet Cage Assembly in Opened Position" on page 5-8, above).**

5-3-2 Front End Unit - Location in the System (cont'd)

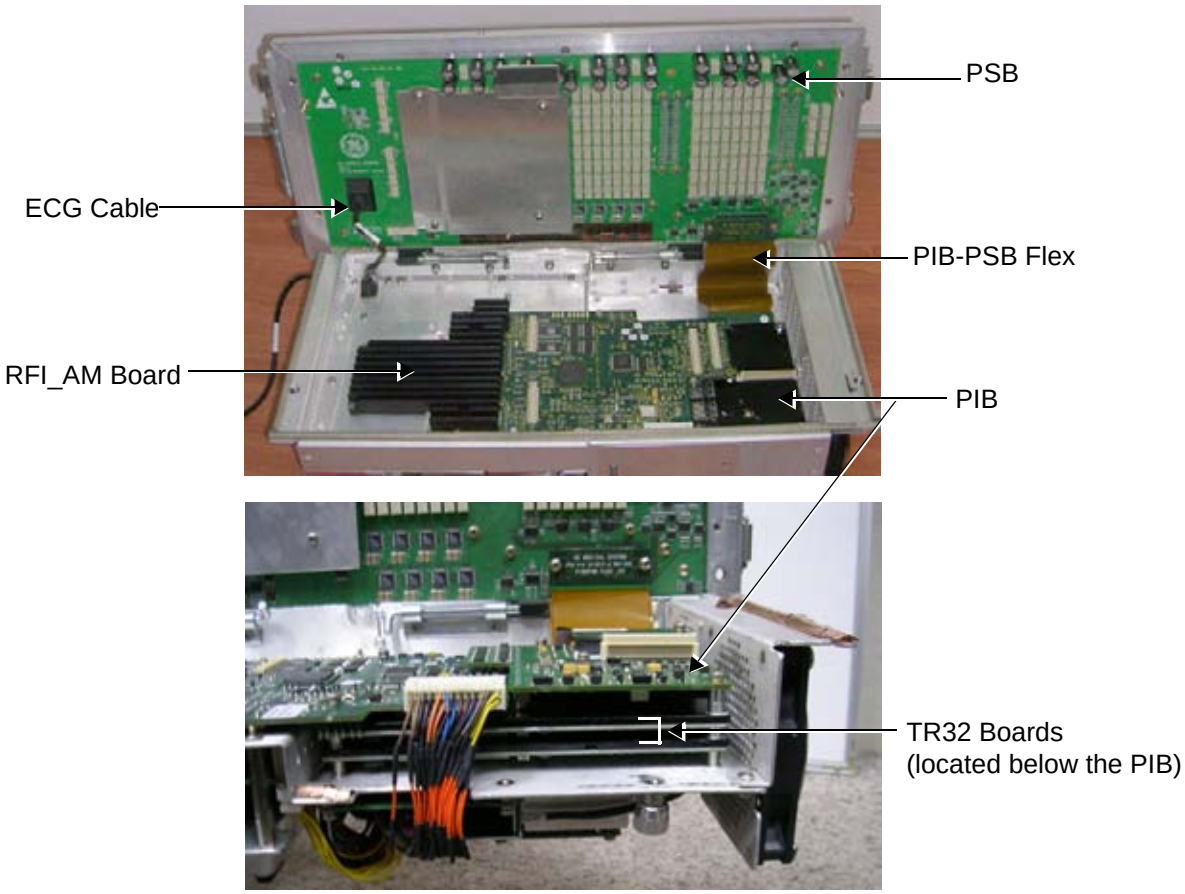


Figure 5-7 Cabinet Cage Assembly showing Position of Boards (PSB, PIB, RFI_AM and TR3)

5-3-3 RFI_AM Board

The RFI_AM Board combines the following functionalities:

- Front End Control
- Radio Frequency & Tissue Processing
- PCI Bus Interface

5-3-3-1 Tasks Performed by the RFI_AM Board

- System Master Clock generator
- Transmitter Control
- ATGC Control
- Receive Focusing Control
- Analog Test Signal Generator
- Tx voltage Enable/Disable
- Probe Sensing
- Control of TR32, PIB or PSB Boards
- Ultrasound data acquisition and processing

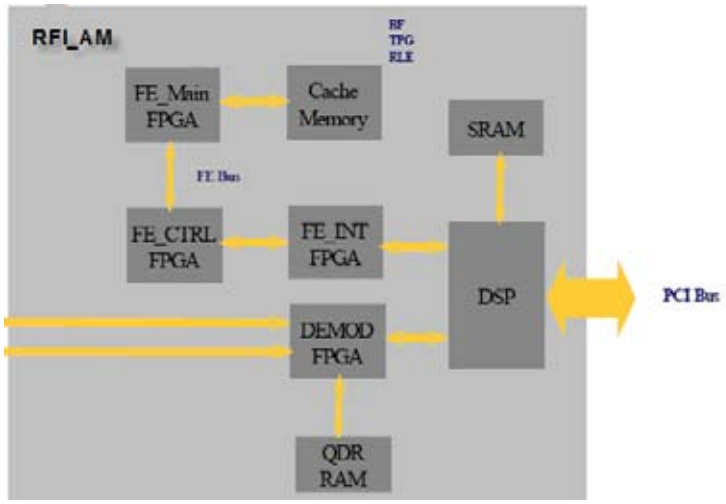


Figure 5-8 RFI_AM Block Diagram

5-3-3-2 Watchdog and Power ON Reset

For safety reasons, a HW watchdog stops ultrasound transmit and resets the DSP if the DSP stops toggling the watchdog inputs.

Once enabled, it is not possible to disable the watchdog unless the board is reset, or power is cycled.

5-3-3-3 Boot-up of DSP and Firmware

When the power is turned ON, the DSP is reset, and all FPGAs are blank. The DSP is connected to PCI directly, and can only boot up with help from the Host.

5-3-3 RFI_AM Board (cont'd)

5-3-3-4 FPGA Download

The FPGAs contain no configuration upon power-ON; FGPA Download proceeds as follows:

1.) The actual FPGA contents (bit-streams) are written into DSP memory from the Host.
2.) The DSP configures serial port 0 to aid configuration.
3.) The DSP writes the bit-streams to serial port 0.
4.) The DSP verifies that the FPGAs are configured correctly.

5-3-3-5 PCI Connection

The RFI_AM Board interfaces directly to the PCI bus via the DSP PCI to the local bus bridge.

5-3-3 RFI_AM Board (cont'd)

5-3-3-6 RFI_AM Board Connectors

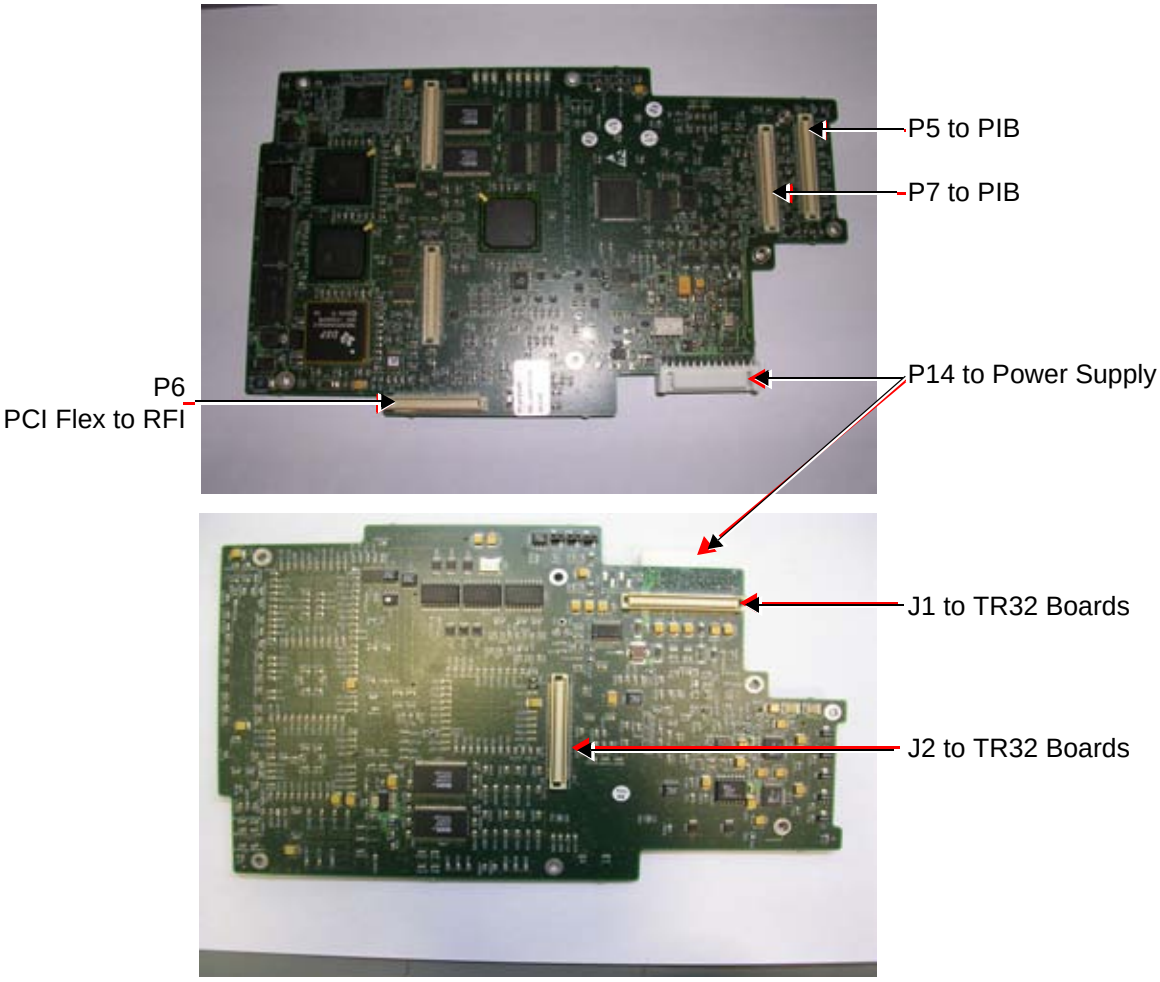


Figure 5-9 RFI_AM Board Connector Locations

Table 5-2 RFI_AM Board Connectors

Connector #	Description
P5	To PIB
P6	PCI Flex to RFI
P7	To PIB
P14	To power supply
J1	To TR32 Boards
J2	To TR32 Boards

5-3-3 RFI_AM Board (cont'd)

Table 5-3 RFI_AM Board - Input DC Voltages

Input	Description	Connector - PIN#	Connected From
+3.3 V	DC voltage from PS	P14 1-4	From PS
HVP_IN	Fixed DC high voltage +80 V	P14-9	From PS
HVN_IN	Fixed DC high voltage -80 V	P14-11	From PS
+THV	Transmit high voltage varies from 0 to +50 V	P14-12	From PS
-THV	Transmit high voltage varies from 0 to -50 V	P14-14	From PS
+5 V_IN	DC voltage from PS	P14-16	From PS
-5 V_IN	DC voltage from PS	P14-20	From PS
+12 V_IN	DC voltage from PS	P14-18	From PS
1.8 V	DC voltage from PS	P1421, 22	From PS

5-3-3-7 Probe Management

5-3-3-7-1 Mechanism

The RFI Board performs the following probe management functions:

- Controls the selection of a probe connector
- Senses the Probe *type*
- Senses the Scan Plane Angle on TE probes
- Senses the Probe *temperature*
- If the temperature exceeds the *maximum* temperature, the RBI stops scanning and disables Tx voltage.

  The temperature references are set to 41.3 ^{o}C and 43.0 ^{o}C
- If the temperature reading falls below *minimum* temperature, the RBI stops scanning and disables Tx voltage.

  The minimum temperature references are set to 15 ^{o}C. A temperature reading as low as 15 ^{o}C indicates a probe temperature-sensing error.

5-3-4 TR32 Boards (Transmitter/Receiver)

5-3-4-1 General Description

The TR32 has 64 receive channels and is made up of two identical TR32 Boards: *TR32A* and *TR32B* (see Figure 5-10). Each TR32 Board is a complete 32-channel ultrasound Front End that includes the following features and functions:

- 32 Transmitters
- 32 receiving channels, T/R switch, Pre-Amp, TGC
- 32 channel Beam Former
- First stage of Analog Beam-Former for CW mode, included in the receive input ASIC
- Clock distribution, starting with input at PECL level

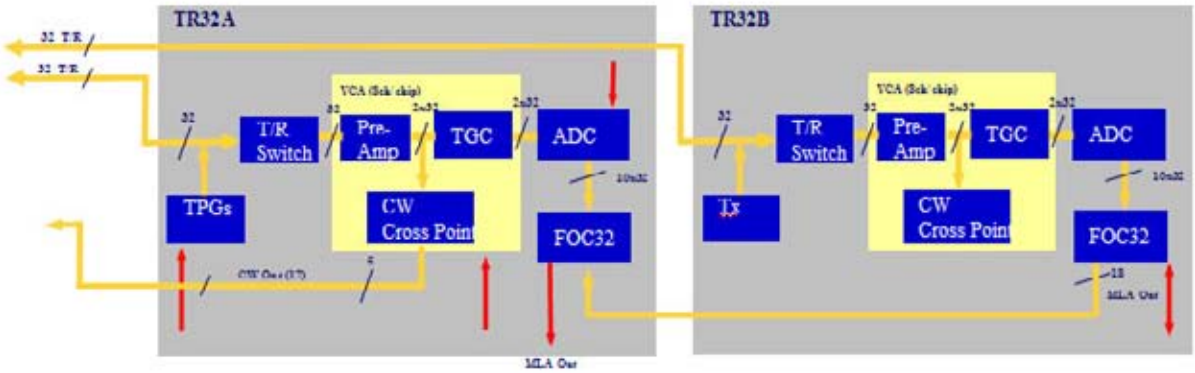


Figure 5-10 TR32 Board Block Diagram

Figure 5-11 TR32 Board - Upper View

5-3-4 TR32 Boards (Transmitter/Receiver) (cont'd)

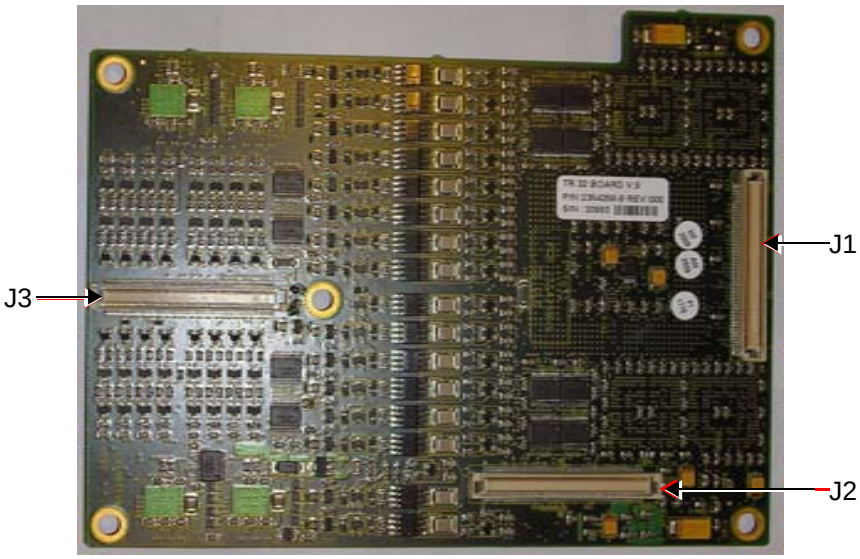


Figure 5-12 Connectors on TR32 Board - Bottom View

Table 5-4 TR32 Board Connectors

Connector #	Description
P1	**To RFI Board**
P2	**To RFI Board**
P3	**To PIB Board**
J1	**To lower TR32 Board**
J2	**To lower TR32 Board**
J3	**To lower TR32 Board**

Table 5-5 TR32 Board - Input DC Voltages

Input	Description	Connector PIN#	Connected From
5 VA	DC voltage, distributed via RFI Board "A" indicates analog circuit	J2-80, 81, 82	RFI
1.8 V	DC voltage, distributed via RFI Board	J2 85-96	RFI
3.3 V	DC voltage, distributed via RFI Board	J2 97-110	RFI
-5 VA	DC voltage, distributed via RFI Board. "A" indicates analog circuit	J2 78 79	RFI
TXPSP (High voltage positive)	Transmit high voltage varies from +2.5 to +50 V distributed via RFI Board	J2 69,71,73	RFI
TXPSN (High voltage negative)	Transmit high voltage varies from -2.5 to -50 V distributed via RFI Board	J2 70, 72, 74	RFI

5-3-4 TR32 Boards (Transmitter/Receiver) (cont'd)

Each TR32 Board has 32 channels and includes a 32-channel Digital Beam Former (consisting of one FOC32 ASIC).

Inputs are 32 probe lines that have gone through aperture selection, performed in the PSB Board. Outputs are MLA0 and MLA1 digital buses from the Beam Former and CW output lines to the Analog CW BF.

The MLA output bus of TR32B is connected to the MLA input bus of TR32A, giving a 64-channel BF on the MLA output.

All required control, memory and clocks for the two TR32 Boards reside in the RFI Board.

The two TR32 Boards are linked together in parallel. The way in which they operate depends upon the probe currently in use, and also on the current type of Transmit/Receive mode.

Transmit/Receive modes can be divided into two types, as shown in the following examples:

- CW Mode - half the channels *transmit* signals, and half the channels *receive* signals, simultaneously.
- 2D Mode - signals are propagated between the channels; there is a specific time delay between *transmit* and *receive* - data is then interpolated in accordance with the delay, and the image is created.

The TR32 Boards are connected to the RFI Board by stacked connectors, as shown Figure 5-13 "TR32 Board - Stacked Connectors" on page 5-16.

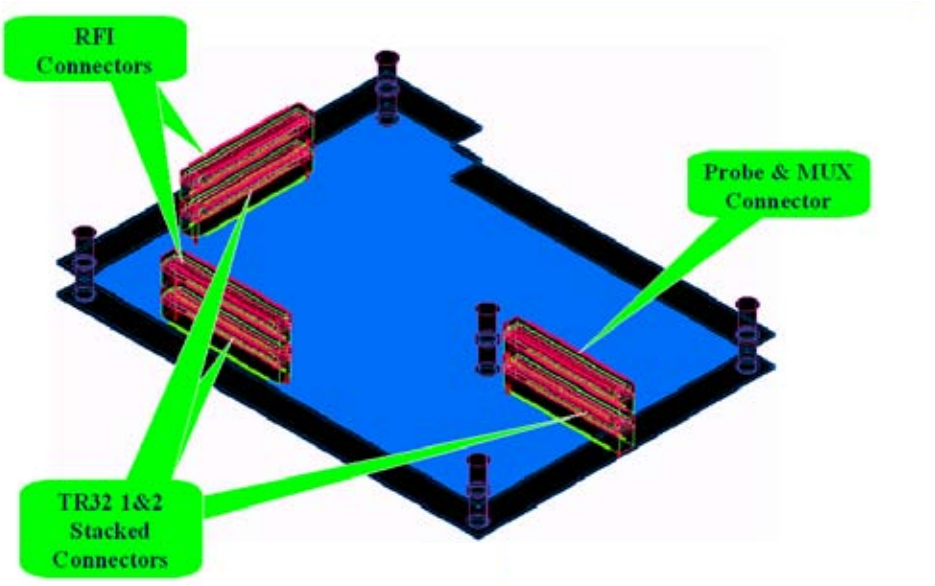


Figure 5-13 TR32 Board - Stacked Connectors

5-3-5 Probe Select Board (PSB)

The Probe Select Board (PSB) enables acquisition and processing of signals from and to probes connected to the front panel. The PSB enables up to 64 receive/transmit channels, and performs the following functions:

- Receiving the channels and connecting them to the TR32 Boards
- Probe connectors
- High voltage MUX that selects 64 out of 128 inputs

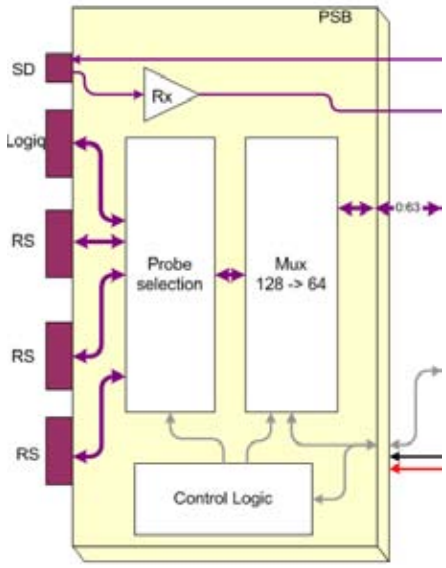


Figure 5-14 Probe Select Board - Block Diagram

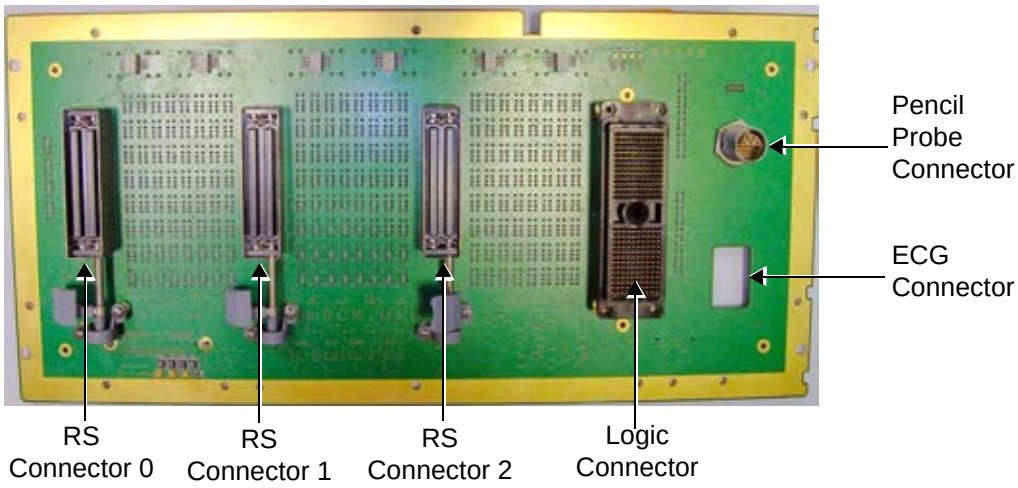


Figure 5-15 Probe Select Board - Upper View

5-3-5 Probe Select Board (PSB) (cont'd)

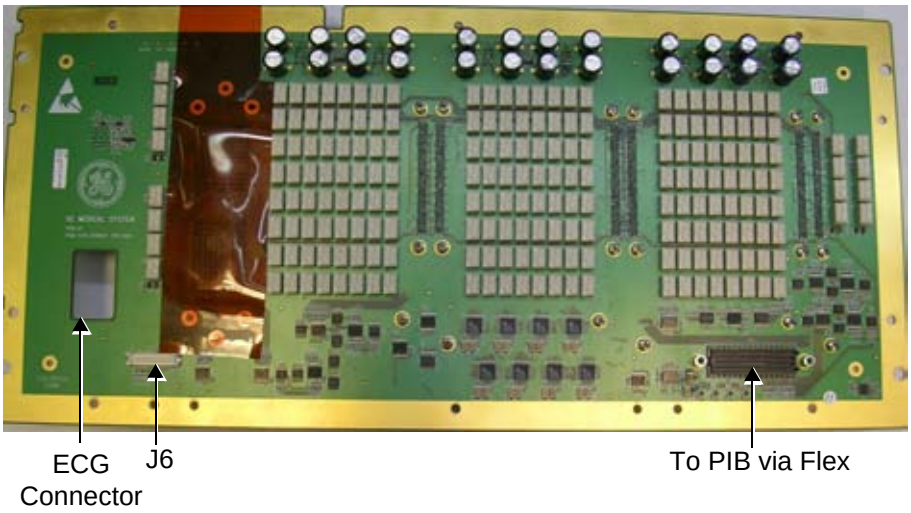


Figure 5-16 Probe Select Board - Bottom View

Table 5-6 PSB Connectors

Connector #	Description
P11	**To PIB via Flex cable**
J6	**Not used**

Table 5-7 PSB - Input DC Voltages

Input	Description	Connector - PIN#	Connected From
12 V	DC voltage, distributed via PIB Board	P11A-A4, A5 P11B-B4, B5 P11C-C4, C5 P11D-D4, D5	PIB via flex cable
3.3 V	DC voltage, distributed via PIB Board`	P11A-A6, A7 P11B-B6, B7	PIB via flex cable
-5 VA	DC voltage, distributed via PIB Board "A" indicates analog circuit	P11A-A8, A9 P11B-B8, B9	PIB via flex cable
5 VA	DC voltage, distributed via PIB Board "A" indicates analog circuit	P11C-C6, C7	PIB via flex cable
HVPSP	Transmit high voltage varies from +2.5 to +50 V distributed via PIB Board	P11A-A1,A2	PIB via flex cable
HVPSN	Transmit high voltage varies from -2.5 to -50 V distributed via PIB Board	P11C-C1, C2	PIB via flex cable

5-3-6 Probe Interface Board (PIB)

The Probe Interface Board (PIB) interconnects the following boards:

- Interface between the RFI_AM and PSB
- Interface between the PSB and the TR32 modules

It also performs the following functions:

- Analog beam former for CW mode
- Pencil probe pulser.

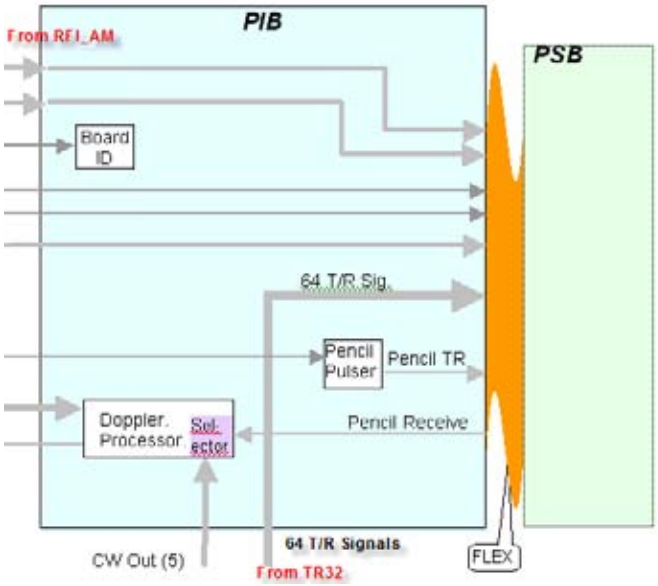


Figure 5-17 Probe Interface Board - Block Diagram

5-3-6 Probe Interface Board (PIB) (cont'd)

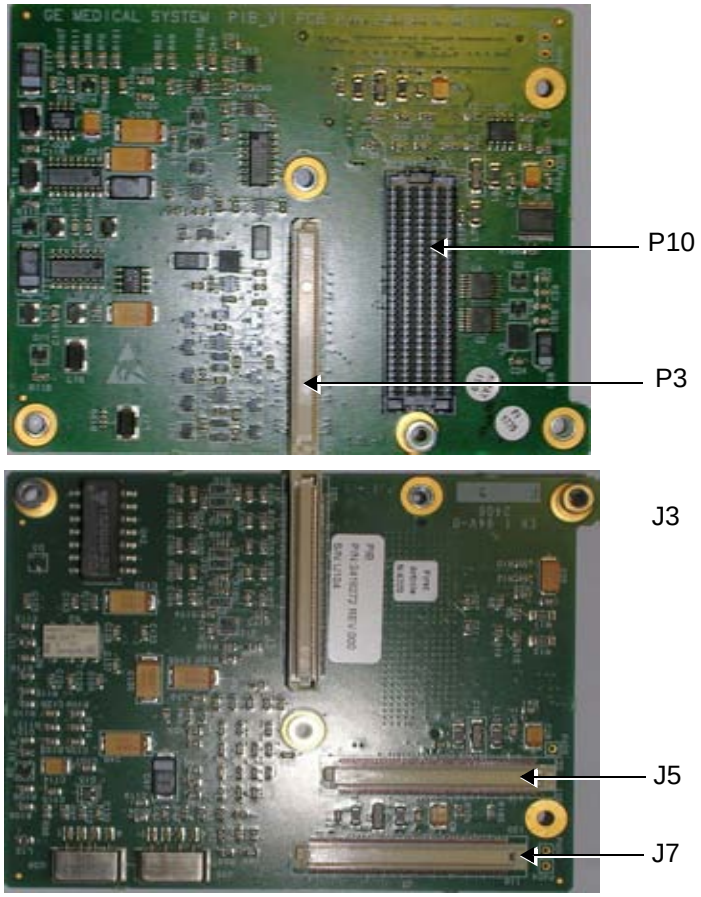


Figure 5-18 Probe Interface Board - Connectors

Table 5-8 PIB Connectors

Connector #	Description
P10	To PSB via Flex
P3	Not used
J3	To TR32
J5	From RFI
J7	From RFI

5-3-6 Probe Interface Board (PIB) (cont'd)

Table 5-9 PIB Input DC Voltages

Input	Description	Connector - PIN#	Connected From
12 V	DC voltage, distributed via RFI Board	J5 -16, 17, 18, 19, 20, 21 J7 -16, 17, 18, 19, 20, 21	RFI Board
3.3 V	DC voltage, distributed via RFI Board	J5 -5, 6, 7, 8 J7 -5, 6, 7, 8	RFI Board
-5 VA	DC voltage, distributed via RFI Board "A" indicates analog circuit	J5 -13, 14, 15 J7 -13, 14, 15	RFI Board
5 VA	DC voltage, distributed via RFI Board "A" indicates analog circuit	J5 -9, 10, 11, 12 J7 -9, 10, 11, 12	RFI Board
HVPSP	Transmit high voltage varies from +2.5 to +50 V distributed via RFI Board	J5 - 2	RFI Board
HVPSN	Transmit high voltage varies from -2.5 to -50 V distributed via RFI Board	J5 - 1	RFI Board

Section 5-4
Back End Processor

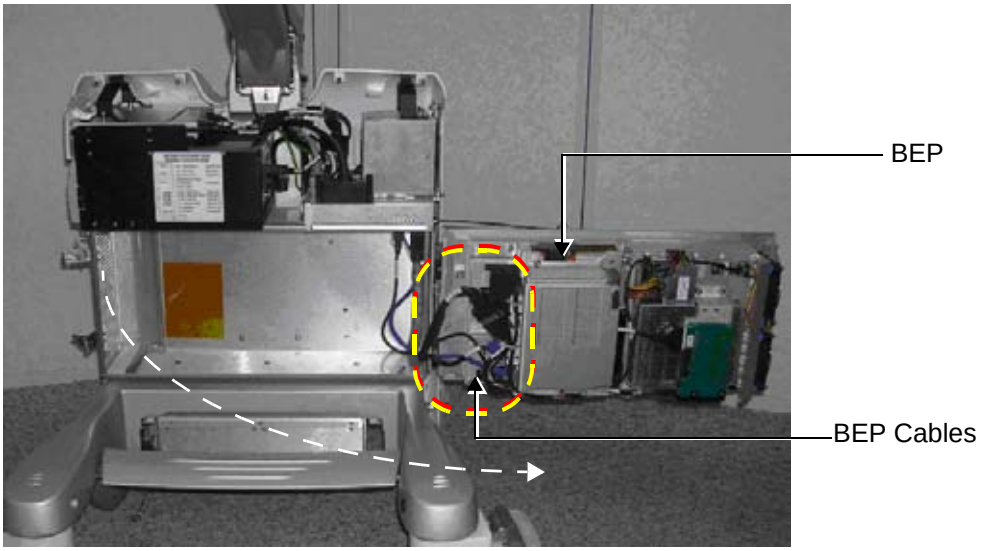
5-4-1 Introduction

The Back End Processor (BEP) supports the operation of the Vivid S5 N or Vivid S6 N ultrasound unit and is the main controller for the system.

A block diagram of the BEP is provided in Figure 5-20 "Vivid S5 N or Vivid S6 N Back End Processor - Block Diagram" on page 5-23.

The various components that comprise the Vivid S5 N or Vivid S6 N BEP are described in the following sections:

- “ETX SBC Central Processing Unit (CPU)” on page 24.
- “ETX Base Board” on page 24.
- “Hard Disk” on page 25.
- “Fan Control” on page 26
- “Temperature Control” on page 26
- “RTC Battery” on page 26
- 5-4-8 "Back End Processor - Location of Components" on page 5-27



Note: cage assembly shown in opened position

Figure 5-19 Location of BEP in Cabinet Cage Assembly

Section 5-4 Back End Processor (cont'd)

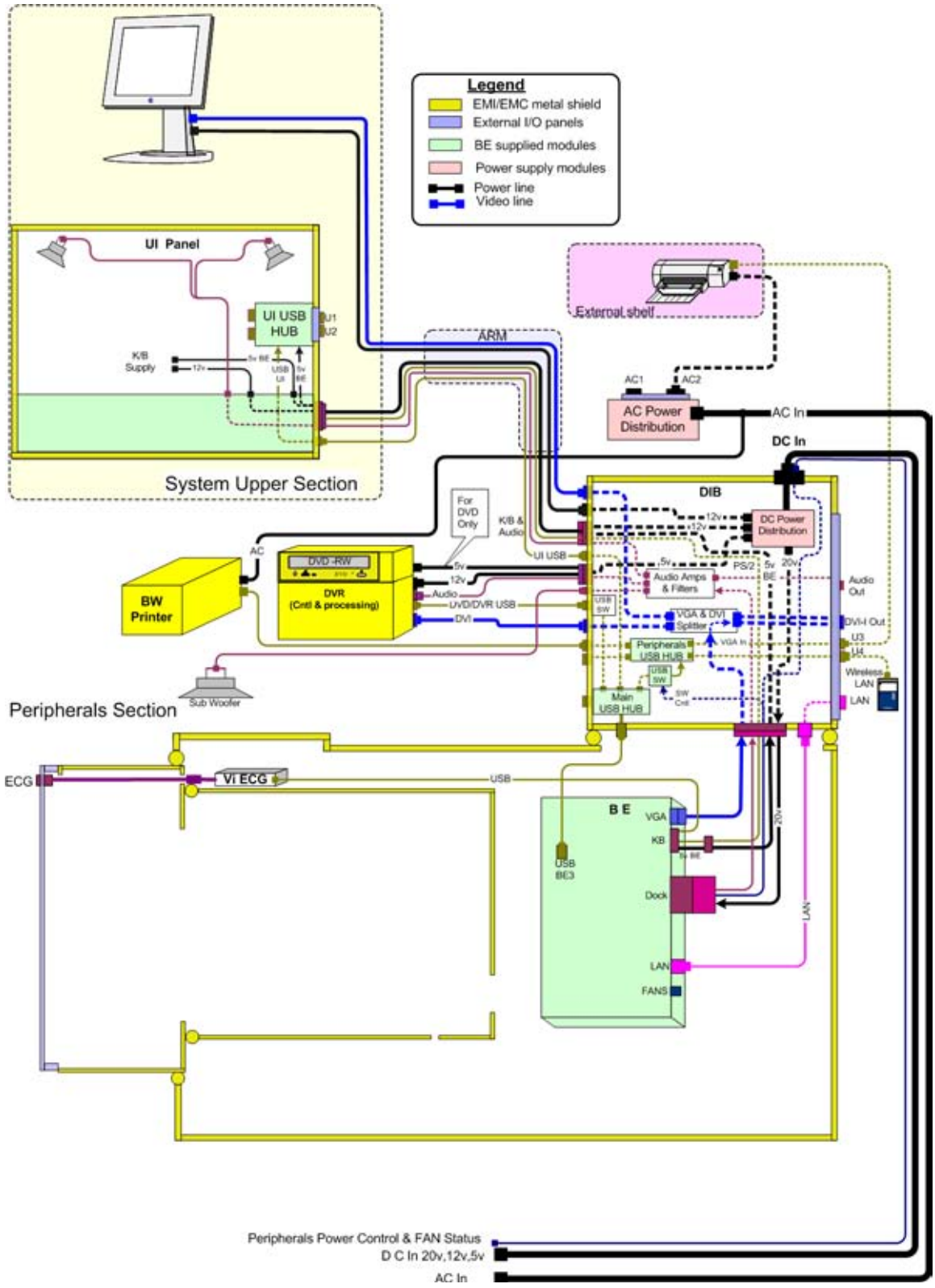


Figure 5-20 Vivid S5 N or Vivid S6 N Back End Processor - Block Diagram

Section 5-4 Back End Processor (cont'd)

For reference, a list of abbreviations used in this section is provided in Table 5-10 "Abbreviations and Definitions" on page 5-24.

Table 5-10 Abbreviations and Definitions

Abbreviation	Definition
BGA	Ball Grid Array
CS	Component Side
EMC	Electro Magnetic Compatibility
FPGA	Field Programmable Gate Array
HDD	Hard disk drive
MTBF	Mean Time Between Failures
PCI	Peripheral Card Interconnect
PLD	Programmable Logic Device
PIB	Probe Interface Board
PMC	Power Management Controller
PS	Power Supply
PSB	Probe Select Board

5-4-2 ETX SBC Central Processing Unit (CPU)

The ETX SBC Central Processing Unit (CPU), which is mounted on top of the ETX Base Board (see 5-4-3 "ETX Base Board" on page 5-24), controls and processes the internal Back End Processor operations. In addition, the CPU supports the Front End via the PCI bus.

The CPU utilized in the Vivid S5 N and Vivid S6 N ultrasound unit is a Pentium -M, 1.4 GHz Processor.

5-4-3 ETX Base Board

5-4-3-1 Overview of ETX Base Board Functions

The ETX Base Board connects all the peripheral modules to the ETX single board computer. The CPU (see 5-4-2 "ETX SBC Central Processing Unit (CPU)" on page 5-24) is mounted on top of the ETX Base Board.

The ETX Base Board provides interfaces to the following components:

- HDD
- FrontEnd (RFI) Board
- USB ports
- Docking port, speaker phones and speaker jacks
- Keyboard
- Battery
- VGA
- Fans
- Power supply

The Power Management Controller (PMC), mounted on the ETX Base Board, ensures automatic transition between the various power modes, stable DC condition, and provides power status LED display.

5-4-3 ETX Base Board (cont'd)

The Docking port, located on the rear panel of the ETX Base Board, provides the connections to the Audio unit on the DIB, discrete control and status lines and 20V-DC power.

Refer to Figure 5-24 "Connectors on the BEP" on page 5-28 for a view of the ETX Base Board showing the location of the various connectors.

Figure 5-21 "ETX Base Board - Block Diagram" on page 5-25 shows a block diagram of the high level functions of the ETX Base Board.

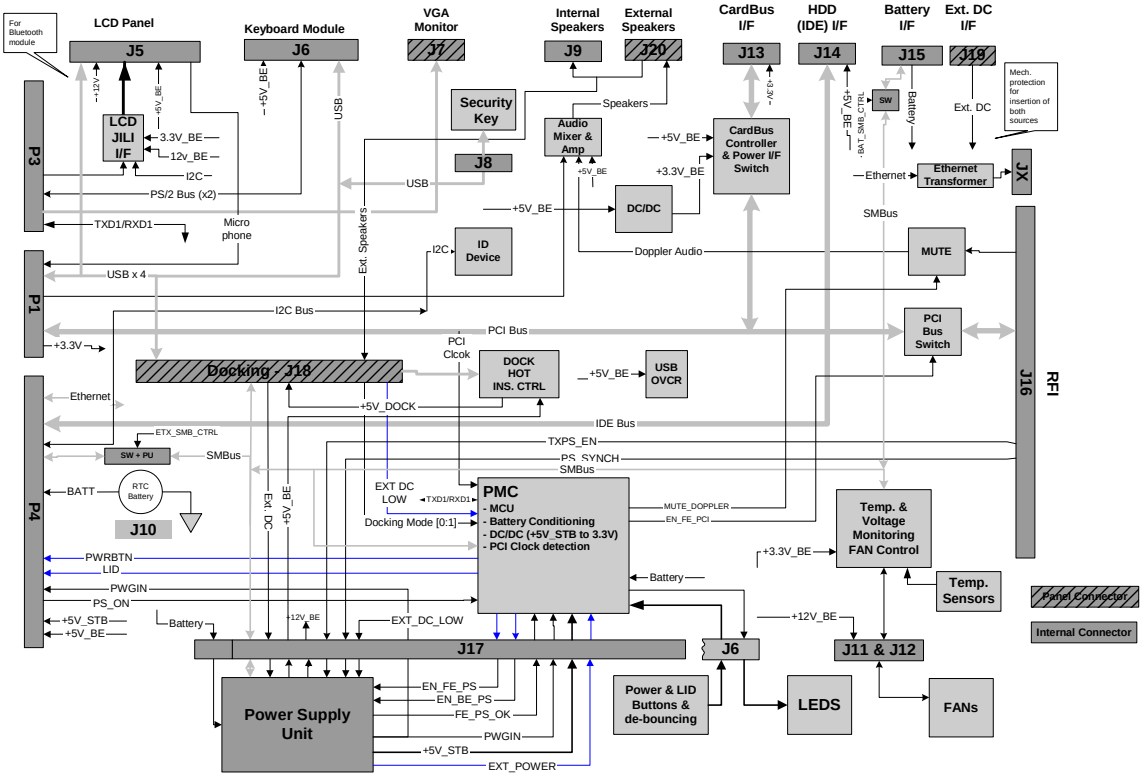


Figure 5-21 ETX Base Board - Block Diagram

5-4-3-2 VGA Interface

The interface to the VGA is via the VGA connector on the rear side of the ETX Base Board. The VGA port is connected to the DIB where VGA signals are converted to DVI and split into three channels to drive the system LCD display (15" or 17", as applicable), external monitor and DVR.

5-4-3-3 CardBus Interface

Not in use.

5-4-4 Hard Disk

The Hard Disk is the main storage device of the Vivid S5 N or Vivid S6 N ultrasound unit. The Hard Disk, which is controlled by the CPU via signals from the IDE Bus, is partitioned into four drives, each of which is designated for different operations, as follows:

- **C: Drive:** Execution of the operating system and the software application, and factory presets. The partition size is 2 GB.
- **D: Drive:** User presets and data. The partition size is 2GB.

5-4-4 Hard Disk (cont'd)

- **E: Drive:** Archiving of all images and reports. The partition size is normally 35 GB but this depends upon the size of the hard disk.
- **F: Drive:** Swap file partition. The partition size is 1GB.

5-4-5 Fan Control

Two Fans, located inside the cabinet cage assembly, are controlled by the fan speed controller located on the FAN Board that is connected to the BEP.

Each Fan has 3 wires: two 12V wires that supply power to the fans; a 3rd wire for sensing the fan's speed.

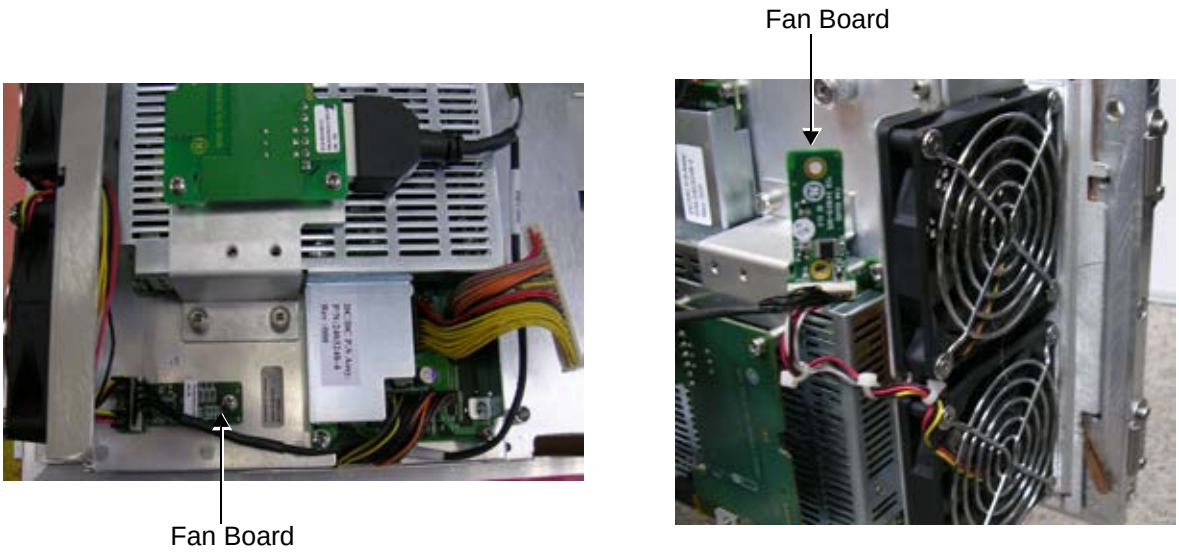


Figure 5-22 Fan Board

5-4-6 Temperature Control

In order to optimize the acoustic noise level, the fans have two operating modes:

- High RPM - when the system temperature is relatively high or after system boot-up (default).
- Low RPM - when the system is in *idle* mode and system temperature is relatively low.

All Front End temperatures are monitored by the Back End via the RFI.

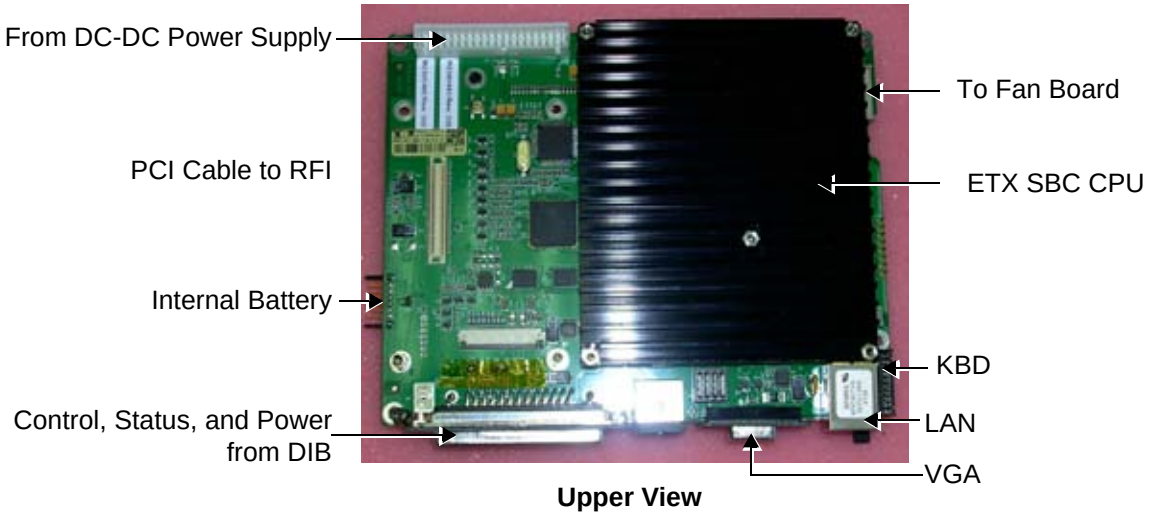
All measured temperature values are accessible from the SMBus.

5-4-7 RTC Battery

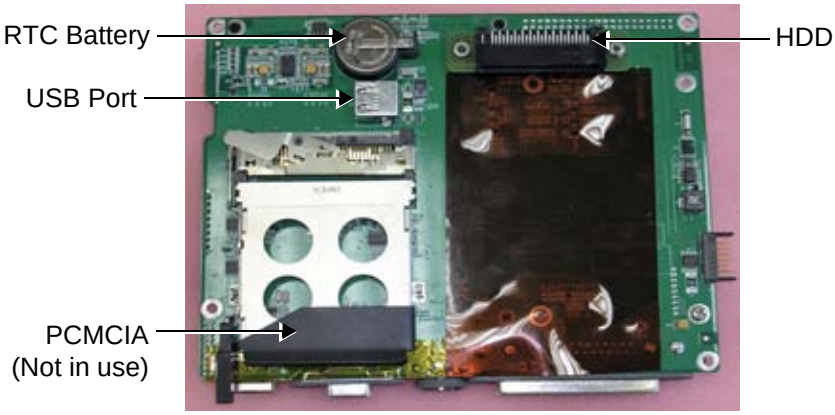
The RTC battery provides power to the ETX real-time clock.

NOTE: ***The RTC Battery should be replaced every 2 years.***

5-4-8 Back End Processor - Location of Components



Upper View



Lower View

Figure 5-23 Views of the Back End Processor (BEP)

5-4-8 Back End Processor - Location of Components (cont'd)

5-4-8-1 BEP Connectors

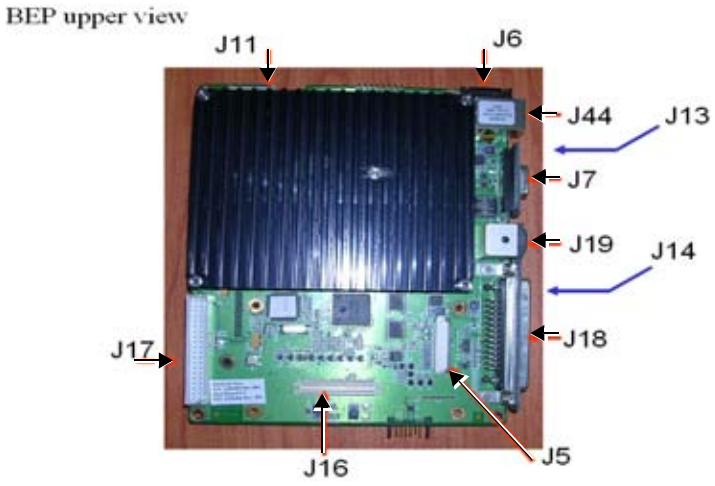


Figure 5-24 Connectors on the BEP

Table 5-11 BEP Connectors

Connector #	Description
J7	VGA
J19	EXT DC INPUT
J18	DOCKING
J20	Speakerphones
J16	RFI
P1:P4[a]	ETX
J5	LCD PANEL
J6	KEYBOARD
J17	PS UNIT
J14	H.D. Adaptor Card
J15	BATTERY
J13	CARDBUS
J10	RTC Battery
J8	Protection Key
J11:J12	FANS
J9	Speakers

a. All connections to P1, P2, P3 and P4 according to ETX specs.

5-4-8 Back End Processor - Location of Components (cont'd)

Table 5-12 BEP Input DC Voltages

Input	Description	Connector - PIN#	Connected From
EXT_DC	20 V DC from PS	J17-1, 2, 3, 4, 5	PS
Battery	Varies from 14 V to 16.7 V DC depending on battery capacity. Distributed via PS.	J17-11, 12, 13, 14, 15	PS
+12 V_BE	DC voltage from PS BE indicates Back End	J17-19	PS
5 V_STB	DC voltage from PS STB indicates Standby	J17-20	PS
+5 V_BE	DC voltage from PS BE indicates Back End	J17-21,22, 23, 24	PS

Section 5-5
Internal and External Input/Output (I/O)

The Distribution Interface Board (DIB) connects between the different system sections and also provides the following functionality:

- A USB HUB connected to the USB port on the lower side of the BEP (Figure 5-23 "Views of the Back End Processor (BEP)" on page 5-27), providing additional USB ports for connecting the UI, Peripherals and the DVD-RW or the optional DVR module.
- VGA-to-DVI conversion and 1-to-3 DVI splitter.
- L/R Audio amplifiers and separation filters to support two high-frequency speakers and one low-frequency speaker.
- USB Switch on the DVD-RW/DVR port for disconnecting the USB line when an external DC power failure is detected.

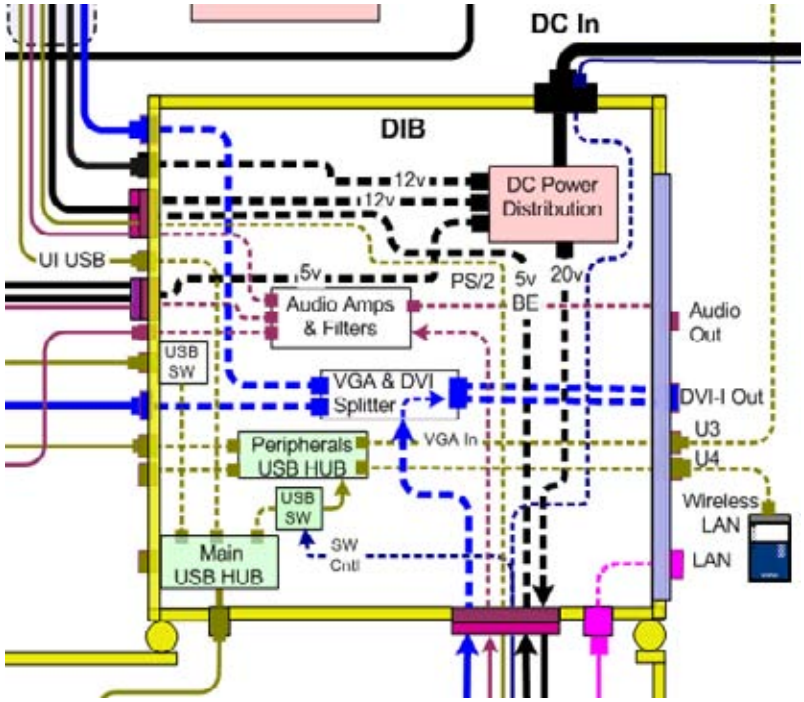


Figure 5-25 Distribution Interface Board - Block Diagram

Section 5-5 Internal and External Input/Output (I/O) (cont'd)

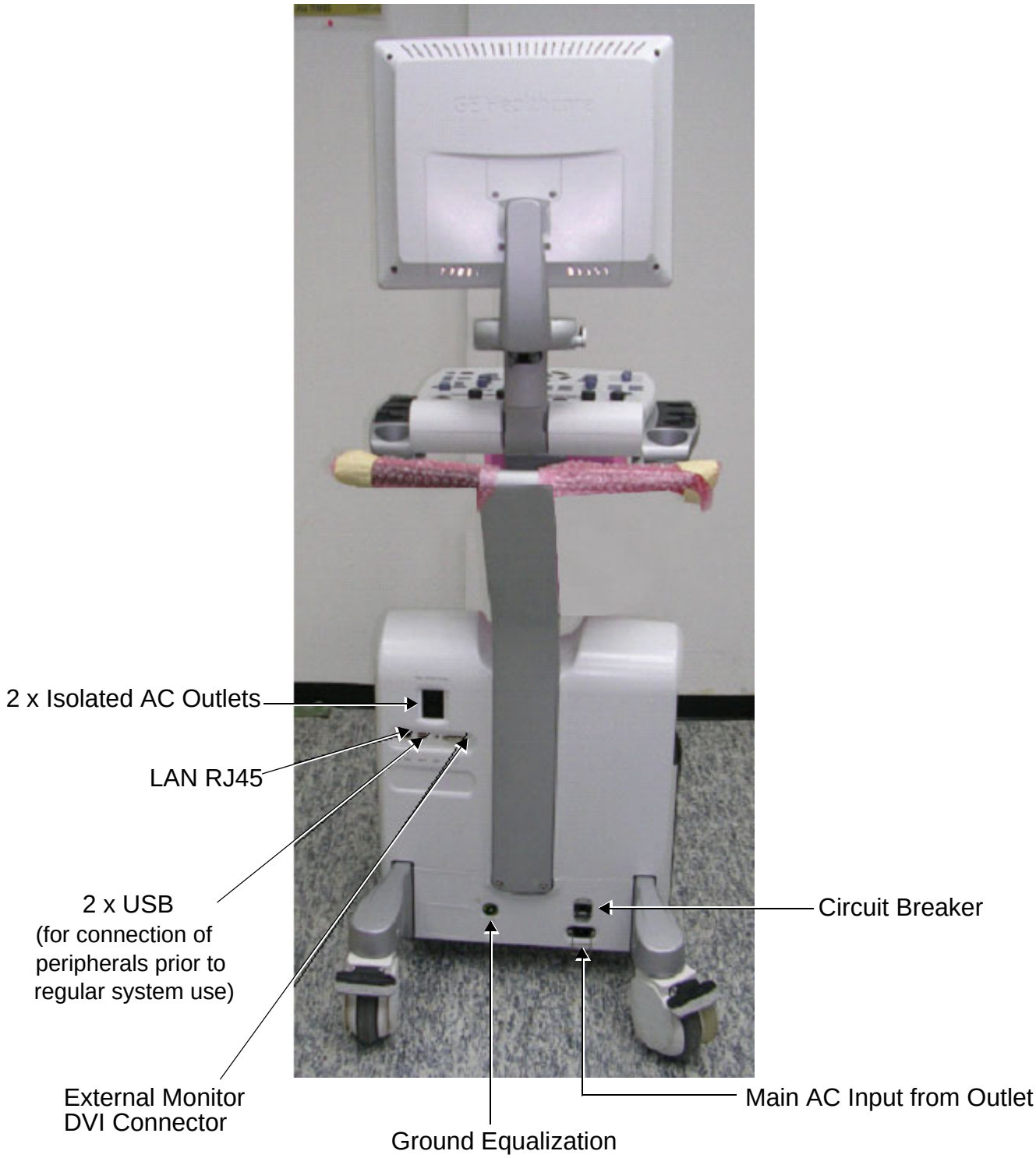

2 x Isolated AC Outlets
LAN RJ45
2 x USB
(for connection of peripherals prior to regular system use)
External Monitor DVI Connector
Ground Equalization
Circuit Breaker
Main AC Input from Outlet

Figure 5-26 System Rear Panel Connections

Section 5-5 Internal and External Input/Output (I/O) (cont'd)

The DIB has the following internal interfaces:

- Two PS/2 channels for A/N K/B and Trackball.
- Extended K/B Interface signals.
- +5v BE supply for the entire K/B module.
- +12v supply for the K/B backlight.
- L & R Audio output channels for two high-frequency system speakers.
- A single Audio output for low-frequency system speaker.
- USB port for system DVD-RW or DVR module
- USB port for the UI HUB input
- Two USB ports for BW printer and Wireless LAN
- Two DVI outputs for system monitor and DVR
- +12 V supply outlet for the LCD system display
- DVR /DVD-RW Interface connector that contains:
  - L & R Audio Input channels for DVR recording
  - +5 V supply to DVD-RW
  - + 12 V supply to DVR
- Main DC Input connector from the main AC module that contains:
  - +20 V Input supply for the scanner PS.
  - +5 V Input supply
  - +12 V Input supply
  - Peripherals' Power control signal from the PMC
- AC module FAN status signal to the PMC.
- Scanner Interface connector that contains:
  - 20 V Input supply for the scanner PS
  - +5 V BE supply for the K/B and USB
  - 12V output for the operator panel and monitor
  - Control and status signals from the PMC
- LAN connector for direct connection of the BEP LAN.
- USB connector for direct connection from the BEP USB port.

The DIB provides the following external interfaces:

- LAN connection.
- Two USB ports for general-purpose use.
- DVI-I (DVI + VGA) output connector for external monitor.
- L/R earphone audio output.

5-5-1 DIB - Interconnections

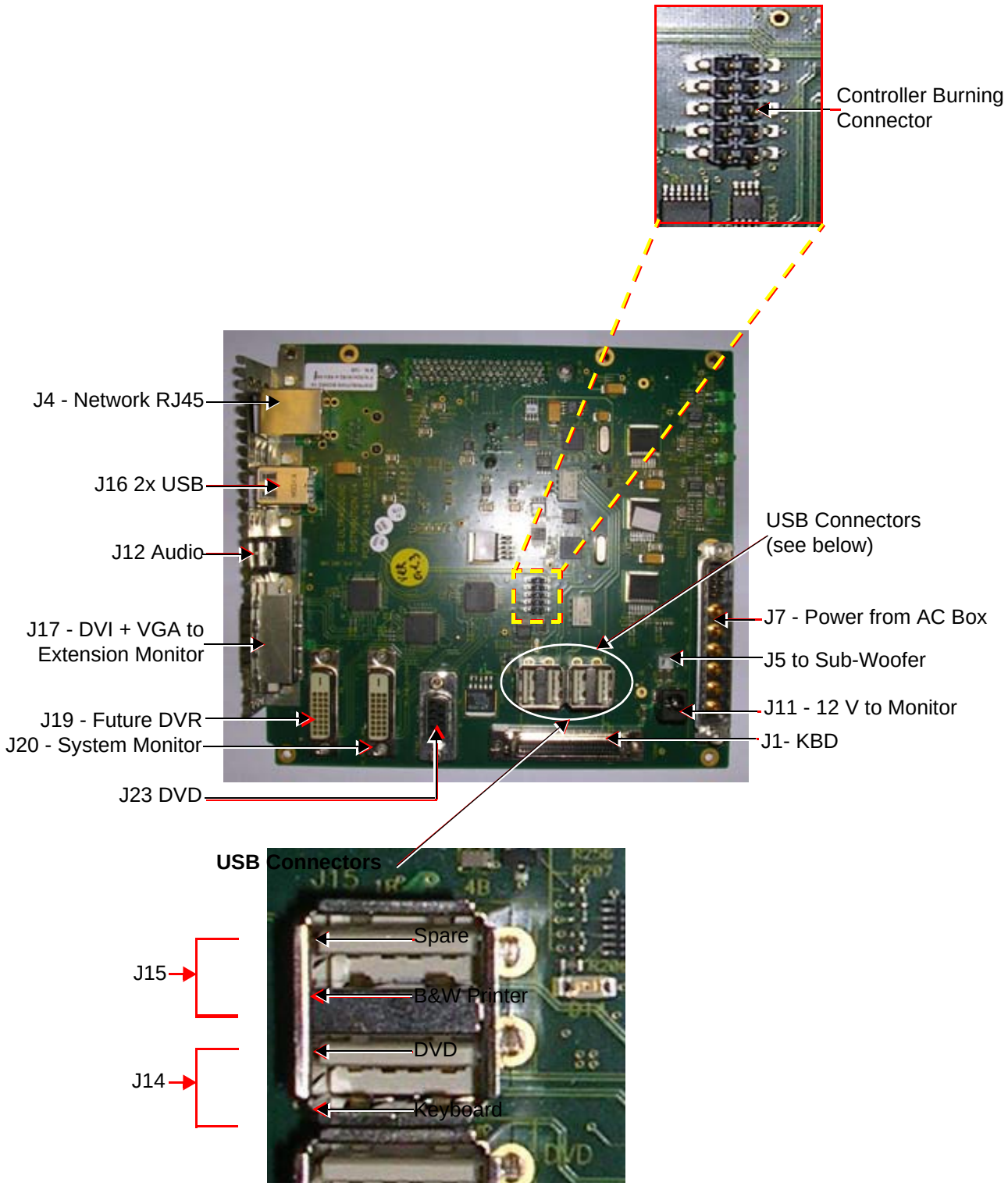


Figure 5-27 DIB - Interconnections

5-5-1 DIB - Interconnections (cont'd)

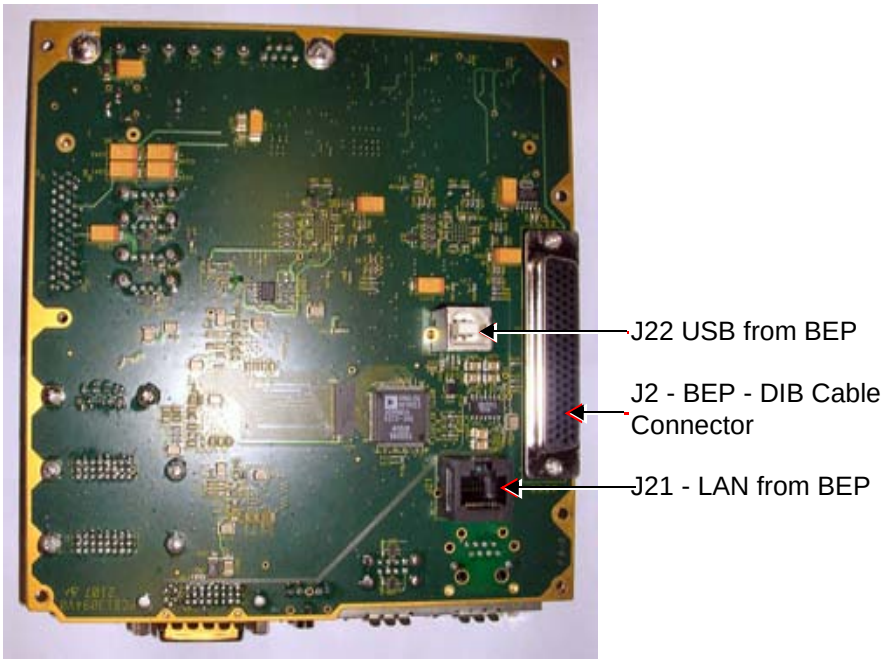


Figure 5-28 DIB - Bottom View

Table 5-13 DIB Connectors

Connector #	Description
J1	To KBD
J2	To BEP - DIB cable connector
J4	Network RJ45
J5	To Sub-woofer
J7	Power from AC-Box
J12	To Audio
J14	DVD and KBD
J15	Spare and B&W printer
J16	USB x 2
J17	To DVI + VGA to ext. monitor
J19	To Future DVR
J20	To System monitor
J21	LAN from BEP
J22	USB from BEP
J23	To DVD

5-5-1 DIB - Interconnections (cont'd)

Table 5-14 DIB- Input DC Voltages

Input	Description	Connector - PIN#	Connected To/ From
5 V_BE	DC voltage distributed via BEP BE indicates Back End	J2-1, 3, 26, 56	Docking station
20 V	DC voltage distributed to BEP	J2-20,39, 59, 78	Main DC to BE
3.3 V_STB	DC voltage distributed to BEP	J2-12	Main DC to BE
5 V	DC voltage distributed via AC Box	J7-1	From AC unit
12 V	DC voltage distributed via AC Box	J7-3	From AC unit
20 V	DC voltage distributed via AC Box	J7-5	From AC unit
12 V	DC voltage to KBD distributed via DIB	J1-29, 3, 4, 30	To KBD
5 V_BE	DC voltage to KBD distributed via DIB	J1-33, 6, 16, 24, 25, 33, 41, 49, 50	To KBD
3.3 V_STB	DC voltage to KBD distributed via DIB	J1-15	to KBD
12 V	DC voltage to KBD distributed via DIB	J11-1	To display

Section 5-6
Power Supply System

5-6-1 Electrical Power

The Vivid S5 N and Vivid S6 N system can operate between 100 and 240 V at 50/60 Hz via an AC/DC converter which supplies a 20 V DC output and 4.5 amps.

5-6-2 Introduction

The power system is composed of three main building blocks:

- **AC Distribution Box** - providing the necessary mains isolation and generating 5 V, 12 V and 20 V DC voltages. See Table 5-15 "Destinations and Voltages" on page 5-36 for the destination and details of each voltage.

Table 5-15 Destinations and Voltages

Assembly	Voltage
Scanner	20 V
Display	12 V
K/B Backlight	12 V
Audio Amp	12 V
DVR	12 V
VGA to DVI and Splitter	5 V
DVD-RW	5 V

- **AC Distribution Panel** - provides a single isolated AC outlet for an integrated BW Printer and two isolated power outlets for optional connection of external peripherals.

- **DC/DC Power Supply Unit** - located inside the cabinet cage assembly, provides the Vivid S5 N or Vivid S6 N system with both Low Voltage and High Voltage power, and also enables recharging of the battery.

  - The Power Supply Unit controls the following main functions:
    * Input switching stage - selects between the external DC source and the internal battery
    * Back End Low Voltage power supply (LVPS)
    * Standby power supply
    * Front End Low Voltage power supply (LVPS)
    * Front End High Voltage power supply (HVPS)
    * Battery charger controlled by the Power Management controller
    * Control circuitry (used for monitoring, charger control and auxiliary functions).
    * The PS communicates with the host CPU via the SMBus

5-6-3 AC Distribution Panel

The distribution of isolated local AC power is allocated in the peripherals section, and divided as follows:

- A single Isolated Internal power connection for optional integrated BW Printer
- Two Isolated External power outlets for optional connection of external peripherals

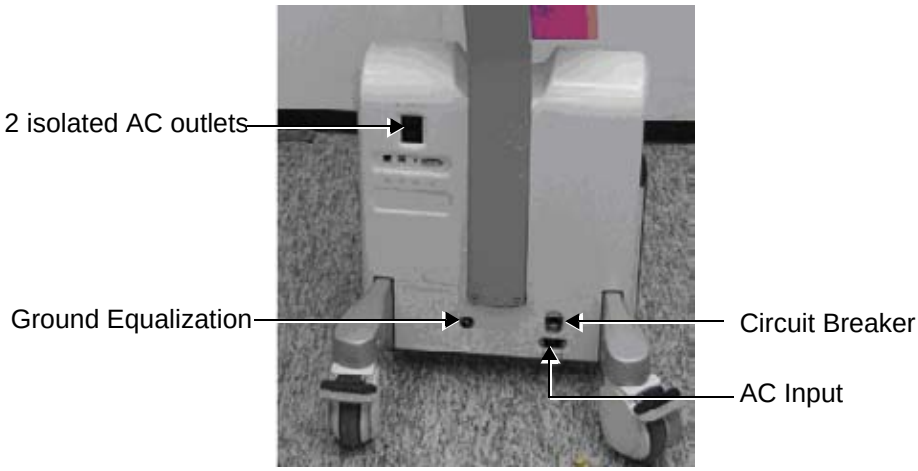


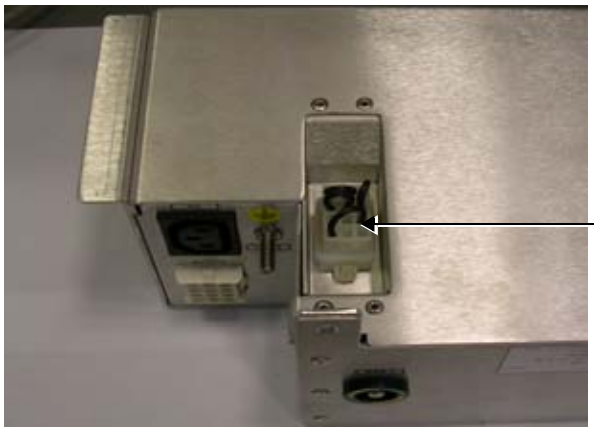
Figure 5-29 Location of AC Distribution Panel

Table 5-16 AC Distribution Panel - Connectors

Connector #	Description
P1	AC input to system
P2	Isolated AC input
J6	Isolated DC output
GB#1	System Ground Equalization

5-6-3 AC Distribution Panel (cont'd)

Side View



Top View

Figure 5-30 AC Distribution Box - Side and Top Views

5-6-4 Power Supply Unit Components

As shown in Figure 5-31 "Vivid S5 N or Vivid S6 N Power Supply Unit Components - Block Diagram" on page 5-39, the Power Supply Unit comprises the following components:

- Rechargeable Battery
- PS Controller and Monitor
- DC Source Selector
- Battery Charger
- High Voltage Power Supply (HVPS)
- Low Voltage Power Supply (LVPS)

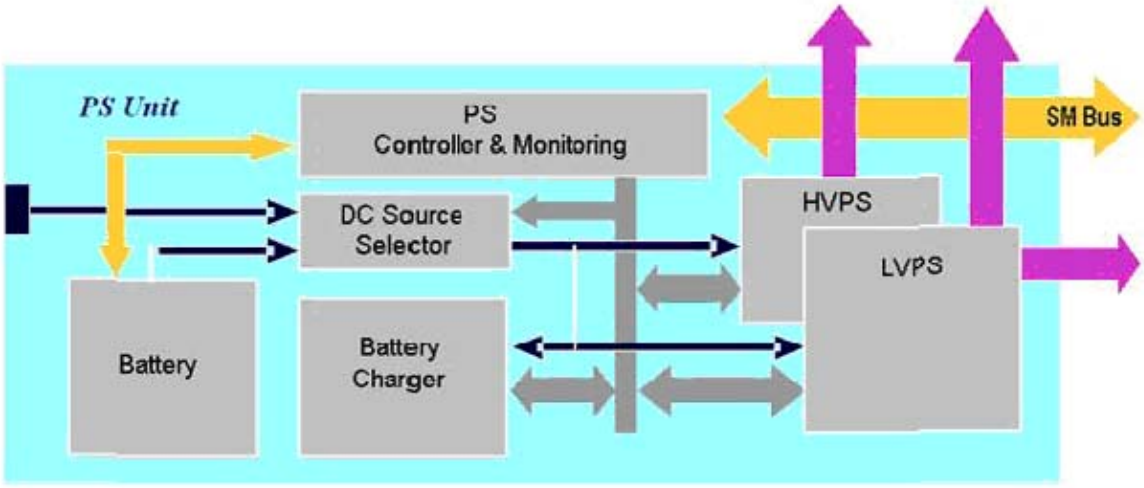


Figure 5-31 Vivid S5 N or Vivid S6 N Power Supply Unit Components - Block Diagram

5-6-4-1 Critical Temperature Sensor

The PS Unit includes temperature sensors . When the monitoring application measures the maximum temperature limit or above, it will shut down the system. After the temperature settles down, the PS unit will enable the DC-DC operation.

5-6-5 DC Source Selector

This circuitry selects the source of the power. When the AC-to-DC converter input into the system is higher than 18 V, the system will be powered by the AC-to-DC converter. Otherwise, the selector will look for an alternative power source (the battery), expecting to receive between 12 and 16V DC.

5-6-5 DC Source Selector (cont'd)

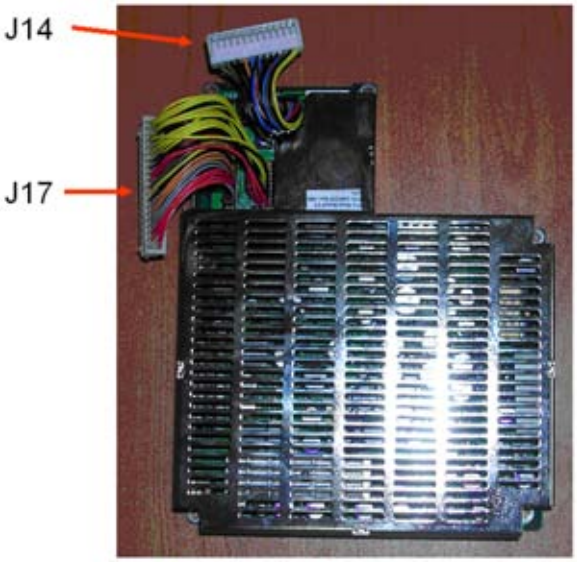


Figure 5-32 DC Source Selector

Table 5-17 DC Source Selector Connectors

Connector #	Description
J14	To RFI
J17	To BEP

5-6-6 Rechargeable Battery Pack Assy (GPA)

The lithium ion rechargeable battery provides a backup mechanism to the Vivid S5 N or Vivid S6 N system whenever an AC power source is not available. The battery module is supplied with a lithium ion rechargeable battery pack (GPA) installed in the battery bay, as standard.

The Vivid S5 N or Vivid S6 N has built-in charger functionality (see Figure 5-31 "Vivid S5 N or Vivid S6 N Power Supply Unit Components - Block Diagram" on page 5-39) and switches automatically from battery operation to AC operation and *vice versa*.

When shutting down the system, leave the main power cable connected to keep the battery fully charged.

NOTE: The lithium ion technology used in the system's battery is significantly less hazardous to the environment than the lithium metal technology used in some other batteries.

NOTE: The battery is designed to be replaced every 2 years.

CAUTION The battery is designed to work with Vivid S5 N or Vivid S6 N systems only. Only use the batteries authorized by GE Healthcare.

WARNING Used batteries should not be placed with common household waste products. Contact your local authority for the location of a chemical waste collection program nearest to you.

5-6-6 Rechargeable Battery Pack Assy (GPA) (cont'd)

CAUTION **The battery has a safety device.**

- Do **not** disassemble or alter it. Charge the batteries only when the ambient temperature is between 0° and 65° C (32° and 149° F) and discharge the batteries between -10° and 55° C (14° and 131° F).
- Do **not** short-circuit the battery by directly connecting the battery terminals with metal objects.
- Do **not** heat the battery or incinerate.
- Do **not** expose the battery to temperature over 60° C (140° F). Keep it away from fire and other heat sources.
- Do **not** charge the battery near a heat source, e.g. fire or heaters.
- Do **not** leave the battery in direct sunlight.
- Do **not** pierce the battery with a sharp object, hit it, or step on it.
- Do **not** use a damaged battery. Do not solder a battery.
- Do **not** connect the battery to an electrical outlet.

CAUTION **If the Vivid S5 N or Vivid S6 N portable ultrasound system is not being used for periods of one month or longer, the battery should be removed during lengthy non-use period.**

CAUTION **To avoid the battery bursting, igniting, or fumes from the battery causing equipment damage, observe the following precautions:**

- Do **not** immerse the battery in water or allow it to get wet.
- Do **not** put the battery into a microwave oven or pressurized container. If the battery leaks or emits an odor, remove it from all possible flammable sources.
- If the battery emits an odor or heat, is deformed or discolored, or in a way appears abnormal during use, recharging or storage, immediately remove it and stop using it.
- If you have any questions about the battery, consult GE or your local representative.

Recommended storage conditions of battery pack:

Short term (less than one month):	0° C (32°F)	to	50° C (122°F)
Long term (more than three months):	10° C (50° F)	to	35° C (95°F).

Section 5-7
Top Console with Monitor and Operator Panel

5-7-1 Keyboard and Operator Panel

Figure 5-33 "Keyboard and Operator Panel Layout" on page 5-42 illustrates the layout of the Vivid S5 N and Vivid S6 N keyboard and operator panel**.** The buttons and controls are grouped together for ease of use; the different areas of the keyboard and operator panel include the following:

- Soft menu Keys – part of the Extended Keyboard
- TGC
- GAIN rotary
- Alphanumeric KB
- Extended KB
- Trackball
- Trackball buttons
- Front panel
- Hand-rest area of front-panel
- Light sensors
- L/R speakers

Figure 5-33 Keyboard and Operator Panel Layout

The Vivid S5 N and Vivid S6 N keyboard unit comprises the main user-interactive devices: an alphanumeric keyboard, a 1.5” trackball, and an extended keyboard. In addition, it includes one or more printed circuit boards (PCBs) designed to carry the various electronic components - these include the keyboards’ controller, TGC potentiometers, USB Hub, and backlight illumination.

Figure 5-34 "Vivid S5 N and Vivid S6 N Keyboard Block Diagram" on page 5-43 shows a high-level functional block diagram of the keyboard unit. The individual components are described in the 5-7-2 "Keyboard and Operator Panel Components" on page 5-43.

5-7-1 Keyboard and Operator Panel (cont'd)

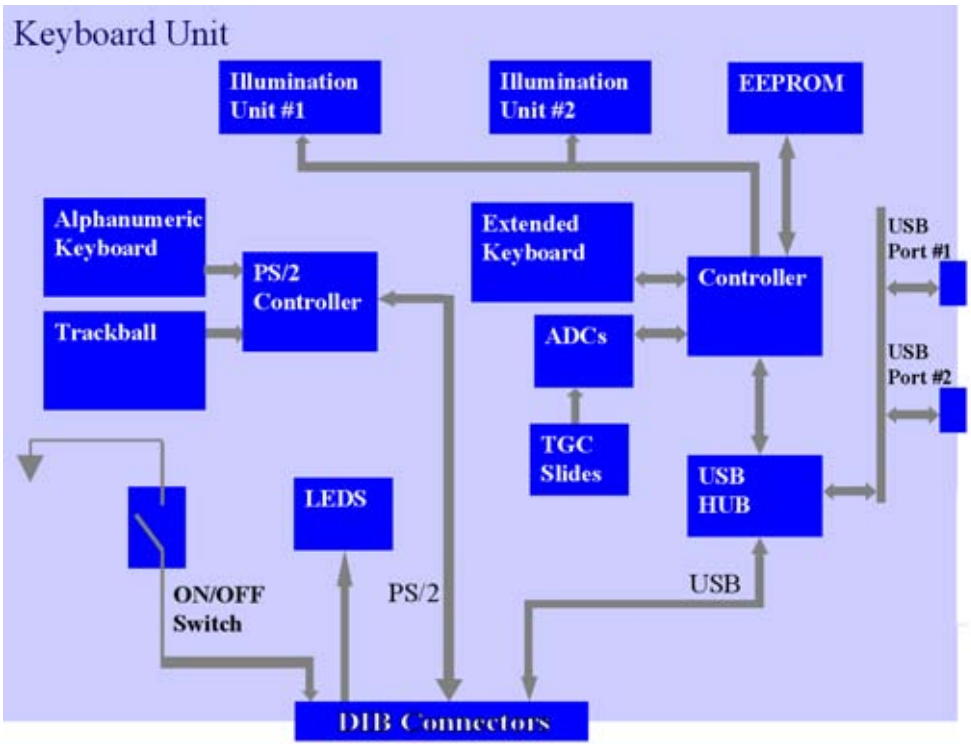


Figure 5-34 Vivid S5 N and Vivid S6 N Keyboard Block Diagram

5-7-2 Keyboard and Operator Panel Components

5-7-2-1 Power ON/OFF Button

The Power On/Off button receives 3.3 V from the BEP. Once shorted, this voltage is routed to the PMC which will activate or perform the appropriate task as required.

5-7-2-2 Alphanumeric Keyboard

The Vivid S5 N and Vivid S6 N alphanumeric keyboard, with a key arrangement similar to that of a laptop keyboard, is based on the global GE International standard keyboard requirements.

The alphanumeric keyboard has a PS/2 interface and supports all standard alpha-numeric functionality, such as, auto-repeat, standard ASCII output codes, *etc*.

Specially designed, high-quality key caps - together with controllable backlighting - provide a keyboard that is comfortable and easy to use.

The upper row of functional keys (F1 - F11), are clearly identified as being assigned to specific ultrasound functions.

5-7-2-3 TGC Sliders

There are six linear Time Gain Compensation (TGC) sliders located to below the alphanumeric keyboard, at the left corner (see Figure 5-33 "Keyboard and Operator Panel Layout" on page 5-42).

These keys, that slide horizontally, are used to compensate for depth-related attenuation in an image.

5-7-2 Keyboard and Operator Panel Components (cont'd)

5-7-2-4 Gain Rotaries

The Gain Rotaries (which may be rotated or pressed) are located above the TGC Sliders. The lower Gain Rotary is used for 2D Gain and the upper Gain Rotary is used for *Active* mode,

5-7-2-5 Extended Keyboard

The Extended keyboard is the ultrasound- specific keyboard which is used to activate the ultrasound system. This keyboard is controlled via the USB hub located on the keyboard PCB.

5-7-2-6 Trackball

The Vivid S5 N or Vivid S6 N operator panel has a 1.5" trackball centrally located above the hand-rest area to provide easy operation.

The trackball has a PS/2 interface and supports a variety of basic PC operations and specific ultrasound controls.

5-7-2-6-1 Trackball Buttons

The buttons surrounding the Trackball (defined as Trackball buttons) can be divided into two groups:

- **Set and Menu Buttons**

  These are equivalent to the normal PC mouse left and right click (**Set** = left-click; **Menu** = right-click). The operation of these buttons is supported via the PS/2 Board.

- **Zoom, Trackball, and Store Buttons**

  These buttons, even though located beside the trackball, are part of the External Keyboard buttons and not part of the Alphanumerical or regular trackball buttons. The operation of these buttons is supported via the USB hub located on the keyboard.

5-7-2-7 Key and Backlight Illumination

The keys on the operator panel are illuminated according to their availability, as follows:

- **Green** - key function is currently *active*.
- **White** - key function is *available* (but not active) in the currently-selected scanning mode and/or options enabled.
- **No illumination** - key is *not available* in the currently-selected scanning mode and/or options enabled.

Three separate backlight illumination functions are provided:

- **On the Alphanumeric Keyboard:**

  The complete alphanumeric keyboard has backlit illumination which is controlled by commands coming from the BEP via the USB Hub.

- **On the Extended Keyboard**:

  Each key on the extended keyboard has its own backlight illumination which is controlled by the BEP via the USB Hub. Available keys are illuminated.

- **Active Key Backlight**:

  Keys which have an On/Off position (enabled/disabled) are illuminated with a green backlight to inform a user of the current state.

5-7-2 Keyboard and Operator Panel Components (cont'd)

5-7-2-8 USB Hub

The USB connection arrives from the DIB. The USB hub drives the following devices:

- Keyboard controller
- Two general-purpose ports
  (current up to 600 mA per port, over-current limit should be used).

5-7-2-9 Power Interface

Power to the keyboard is provided via the DIB keyboard connector.

Three different voltages are supplied to the keyboard:

1.) 3V standby for driving the power On/Off and status LEDs.
2.) 12V powers the LEDs backlight.
3.) 5V BE (Back End) is used for the remaining circuits.

The keyboard operates with ±5% voltage deviation on each supply.

The keyboard has current-limiting circuitry (implemented on the BEP), to protect it against excessive current consumption (via the USB and/or short circuits).

5-7-2-10 Keyboard ID

The keyboard PCB contains an EEPROM which stores a variety of information about the keyboard such as, GE part number, manufacturing date, and revision # of the PCB hardware.

The EEPROM size is 1KB.

5-7-2-11 Keyboard Connectors

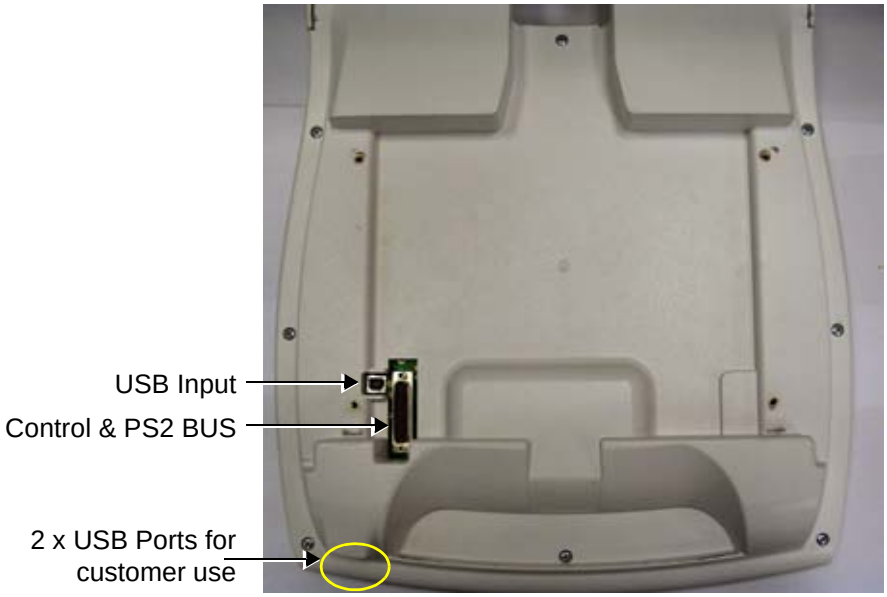


Figure 5-35 Keyboard Module Connectors

5-7-2-12 Monitor Connectors

Figure 5-36 Monitor Connectors

5-7-2-13 Display Unit

The display monitor is a 15" (Vivid S5 N) or 17" inch (Vivid S6 N) LCD.

In order to optimize the display settings, a light-sensing device located on the keyboard is used for measuring the ambient light. This data is processed by the main CPU which adapts the display setting, accordingly.

Section 5-8
ECG Module

5-8-1 Overview

The Vivid S5 N and Vivid S6 N ECG Patient I/O module is designed to enable acquisition of the following signals: ECG, and external ECG. The different pins on the ECG input connector are specifically assigned to support either External ECG or Internal ECG:

- The Internal ECG module supports acquisition of two bipolar ECG channels: leads I, II.
- The External ECG module supports acquisition of a single bipolar ECG input channel ranging from -1 to +1 volt allowing amplification of 1000. The minimal allowed impedance is 10 M ohm.

The ECG module is located in the cabinet cage assembly (see Figure 5-6 "Cabinet Cage Assembly in Opened Position" on page 5-8). All power and communication is supplied to the ECG module via the USB hub located in the keyboard module as shown in Figure 5-37 "ECG Patient I/O Module" on page 5-47.

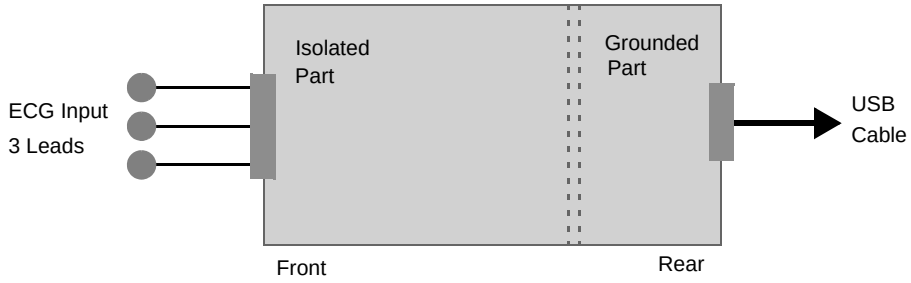


Figure 5-37 ECG Patient I/O Module

A general block diagram of the ECG Patient I/O Module is shown in Figure 5-38 below.

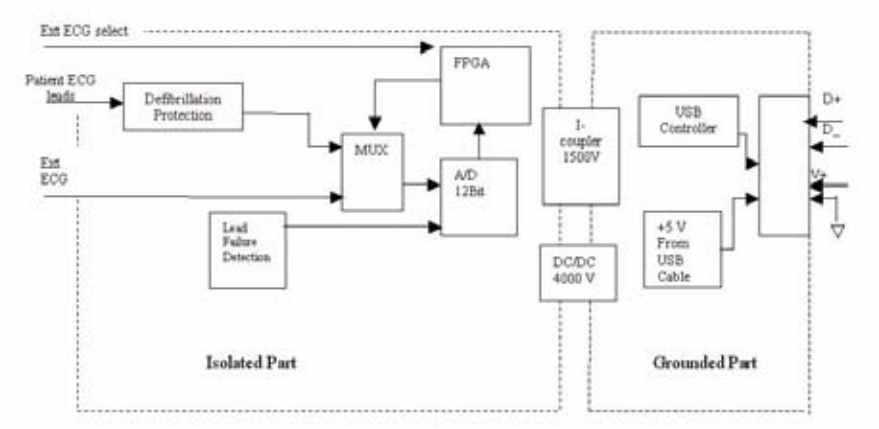


Figure 5-38 ECG Patient I/O Module - Block Diagram

5-8-2 ECG Patient I/O Module Specifications

5-8-2-1 Power Consumption

The ECG and Ext-ECG modules use 5 V (taken from the USB socket on the host).

Estimation: 80mA for ECG function and 50mA when working with EXT-ECG function.

5-8-2-2 Sample Rate

Sampling rate of the ECG signals is: 600 samples/second.

5-8-2-3 Bandwidth

The ECG Bandwidth is 0.05 to 150Hz.

5-8-3 Isolation

The ECG signals are isolated from the Vivid S5 N or Vivid S6 N system to comply with IEC601-1 type CF device classification. All leakage and auxiliary currents apply the values listed in Table 5-18 "Leakage and Auxiliary Current Values" on page 5-48 (taken from table IV in IEC601-1, section 19.3):

Table 5-18 Leakage and Auxiliary Current Values

Leakage Current	Normal Condition	Single Fault Condition
Earth leakage current	0.5mA	1mA
Enclosure leakage current	0.1mA	0.5mA
Patient leakage current	0.01mA	0.05mA
Patient auxiliary current	0.01mA	0.05mA

The ECG signals have double, reinforced isolation (B-a) from live parts. Hence, creepage distance and air clearance in the module are 8 mm and 5 mm respectively, to withstand 4000 volts isolation between applied part and grounded part.

The applied parts and enclosure have basic isolation (B-a).Therefore, creepage distance and air clearance in the module are 4 mm and 2.5 mm respectively, to withstand 1500 volts isolation between applied parts and enclosure.

Section 5-9
Peripherals

5-9-1 Introduction

The following peripherals are used with the Vivid S5 N and Vivid S6 N ultrasound scanner:

- Black & White Digital Printer (connected via USB)
- Color Digital Printer (connected via USB)
- Color Inkjet Printer (connected via USB)
- DVD/CD-RW (connected via USB)
- MOD (connected via a SCSI-to-USB converter)
- Wireless Network Adapter (connected via USB)

All peripherals are connected via USB ports.

5-9-1-1 Printers

5-9-1-1-1 Black & White Digital Printer

The B&W Digital Printer receives image data and the print command via the USB port which is controlled by the keys **Print** or **Alt+Print** on the Vivid S5 N or Vivid S6 N operator panel.

5-9-1-1-2 Color Digital Printer

The Color Digital Printer receives image data and the print command via the USB port which is controlled by the keys **Print** or **Alt + Print** on the Vivid S5 N or Vivid S6 N operator panel.

5-9-1-1-3 Color Inkjet Printer

The Color Inkjet Printer is used to print out reports and exams and is controlled in one of three ways, depending on the system configuration:

- Directly via the USB port
- Via LAN connection

The printing operation to the Color Inkjet Printer is performed by pressing the **Alt+P** keys. Normally, inkjet printers are used to print out Reports but in some cases, also ultrasound images.

5-9-1-2 DVD/CD Reader and CD Writer (DVD/CDR-W)

The DVD/CDR-W is used to back-up images and reports, in a similar way as using the MOD. In addition, the DVD/CDR-W is used as the main source of software upgrades and other service utility operations. Capable of reading all types of CDs including DVD, the DVD/CDR-W is controlled by the BEP via the USB port.

5-9-1-3 Magneto-Optical Drive (MOD)

The MOD is used to back-up images and Reports. The Backing up process enables storage of the images and Reports for future review on Vivid S5 N or Vivid S6 N ultrasound units, or other EchoPac-compatible devices. The MOD is controlled by the CPU via a USB port supported by a USB-to-SCSI converter. Only 2.3 GB media are officially DICOM compatible. Magneto-Optical media of any other size (up to 9.2 GB) may be used for back-up, but will not be compatible with DICOM (even though they will be supported by a variety of GE DICOM reviewing stations such as, EchoPac).

5-9-1 Introduction (cont'd)

5-9-1-4 Wireless Network Adapter

The Vivid S5 N and Vivid S6 N supports a unique type of Wireless Network Adapter. For details regarding type and installation, refer to "Wireless Network Adaptor" on page 23.

The Wireless Network Adapter provides a mobile network connection to the local area network. The Wireless Network Adapter is supported via the USB port.

Section 5-10
Cooling System

5-10-1 General Information

The Vivid 5S N/6S N cooling system comprises two main parts:

- A single, 80x80 mm freely-running FAN located on the left side of the AC Distribution Box. The FAN withdraws air from the AC Distribution Box through the side vents, removing the warm air from AC Distribution Box components. To monitor proper operation of the FAN, a dedicated status signal is routed from the AC Distribution Box to the PMC.
- The cabinet cage assembly includes two fans, which are directly controlled through the FAN controller module, by the monitoring application. The fans withdraw air from the system through the side vents, removing the warm air from around the internal components of the cage. - See Figure 5-39 "Airflow through the Vivid S5 N and Vivid S6 N System" on page 5-51. The fans' speed will be switched from low mode to "high mode" (and *vice versa*), depending on the Front End temperature.

The structure of Vivid S5 N and Vivid S6 N internal components has been designed to provide the best thermal conduction, allowing the maximum amount of heat to be removed from the system. It is crucial that the system ventilation access is not blocked; a distance of at least 20 cm from right and left sides of the system should be kept clear. In addition, operating the system in an unclean environment could introduce foreign objects into the unit and create blockage of the airflow, which may eventually cause irreparable damage to the system. There are therefore some minimal environmental conditions that should be provided for optimum operation of the system - for details and recommendations, refer to Table 2-2 "Environmental Requirements" on page 2-2.

Periodically, it may be necessary to clean the filter and the internal components of the system. This task should be performed by qualified personnel - refer to *Chapter 10 -* for more details.

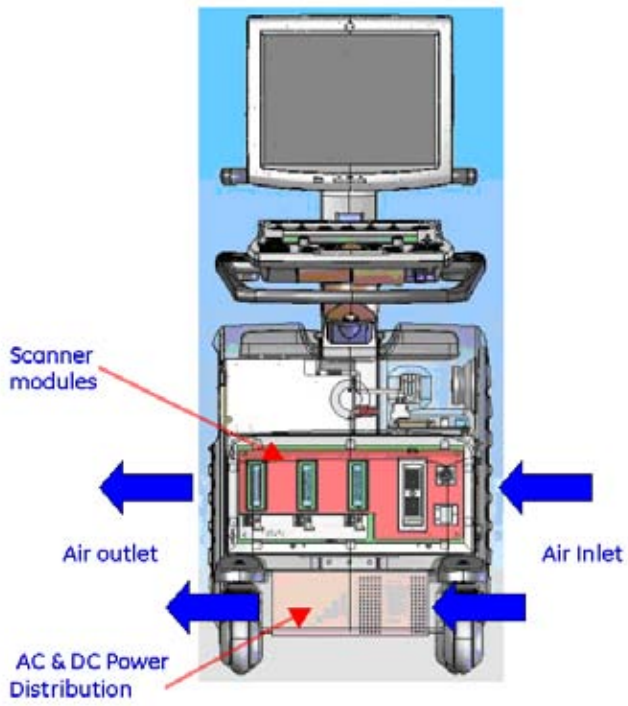


Figure 5-39 Airflow through the Vivid S5 N and Vivid S6 N System

Section 5-11
Common Service Platform

5-11-1 Introduction

The Service Platform contains a set of software modules that are common to many of GE's ultrasound and cardiology systems. This Web-enabled technology provides linkage to e-Services, e-Commerce, and the iCenter, making GE's scanners more e-enabled than ever.

The new Service Platform has the following features:

- Easy connectivity configuration
- Virtual console observation and disruptive mode
- File Transfer from the system

5-11-2 Global Service User Interface (GSUI)

GSUI is the pattern for the user interface. This interface standard will be followed by all modalities to achieve a common look-and-feel for service software across all GEMS products.

5-11-2-1 Internationalization

The user interfaces provided by the service platform are designed for GE personnel and, as such, are in English only. At this time, there is no multi-lingual capability built into the Common Service Interface.

5-11-2-2 Service Login

Press the switch with the Global Service icon ( ) in the status bar at the bottom of the video screen.

This switch links the user or the Field Engineer (FE) to the service login screen.

Figure 5-40 Service Login Screen

5-11-2-3 Access / Security

The service interface has different access and security user levels. Users are only granted access to the tools they are authorized to use.

5-11-2 Global Service User Interface (GSUI) (cont'd)

Table 5-19 Access Authorization

User Level	Access Authorization
Operator	These service tools are normally used in-house and are protected with a password.
Administrator	Use the OnLine Center.
External Service	Access is protected with a password.
GE Service	Requires knowledge of a password.

Every access request, whether successful or not, will be logged into a service access log that is viewable to authorized users.

See *Chapter 7* - Diagnostics/Troubleshooting for more information about InSite and the Global Service User Interface.

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Chapter 6
Service Adjustments

Section 6-1
Overview

6-1-1 Purpose of Chapter 6

This section provides references to the procedures required for testing and adjusting the Vivid S5 N or Vivid S6 N ultrasound scanner. These tests are optional, and may be used to check the system for errors.

NOTE: There are no voltage adjustments required.

6-1-2 LCD Display Adjustments and Calibration

NOTE: All adjustments/calibration described in this section will affect the External Monitor LCD display (if currently connected to the system). Therefore, it is recommended to first make the necessary adjustments on the Vivid S5 N or Vivid S6 N system monitor, then manually adjust the External Monitor (using its own controls), as required.

Overall low image quality or "shades" visible on the Vivid S5 N or Vivid S6 N LCD Display may be the result of improper monitor calibration. Therefore, adjustments may be made to the *Brightness*, *Contrast* and/or *Blue Tint*, as required.

Important: LCD Display adjustments should be made in the correct order, as stated in the following procedures.

NOTE: Incorrect calibration of the Vivid S5 N and Vivid S6 N monitor may also result in less than optimal image quality when reviewing images on a DICOM or EchoPAC station.

Access the Calibration Screen by pressing <**F4**> key (also labeled <**LCD**>) and then select <**TestPattern**> from the soft menu keys.

Then follow the relevant procedure instructions described below.

6-1-2 LCD Display Adjustments and Calibration (cont'd)

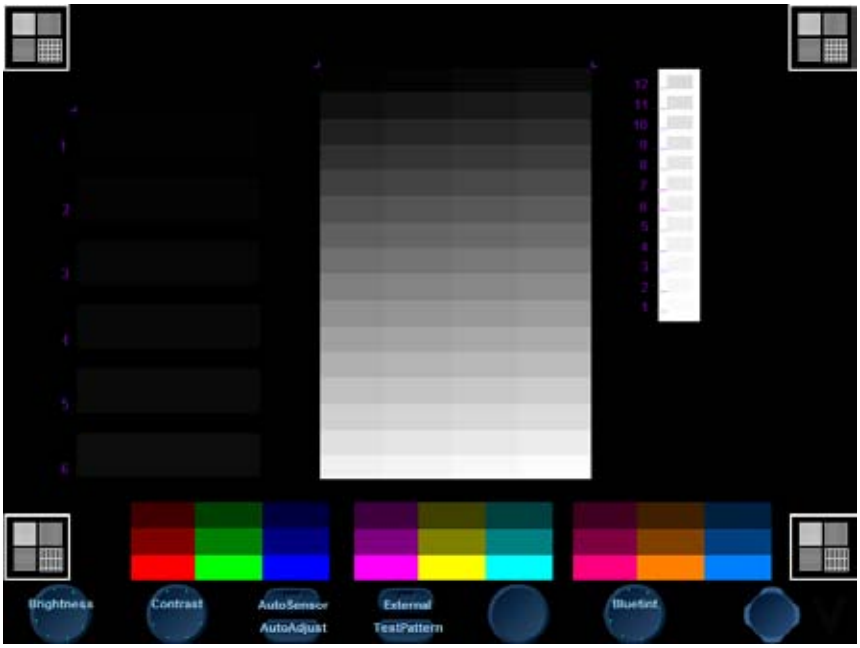

Figure 6-1 LCD Display Calibration Screen

6-1-2-1 Contrast Adjustment Procedure

- **To adjust the Contrast:** Rotate the second rotary knob from left on the soft menus keys, as required.

  Counter-clockwise rotation will ***decrease*** the contrast.

  Clockwise pressing will ***increase*** the contrast.

  To assist in making Contrast adjustments, an adjustment bar is displayed below the screen:

Figure 6-2 LCD Display - Contrast Adjustment

NOTE: It is highly recommended to set the contrast to maximum. Rotate the Contrast rotary knob on the soft menu keys clockwise to increase the number of green bars to 7 (maximum).

6-1-2-2 Brightness Adjustment Procedure

- **To adjust the Brightness:** Rotate the left-most rotary knob on the soft menus keys, as required.

  Counter-clockwise rotation will ***decrease*** the brightness

  Clockwise rotation will ***increase*** the brightness.

To assist in making Brightness adjustments, an adjustment bar is displayed below the screen:

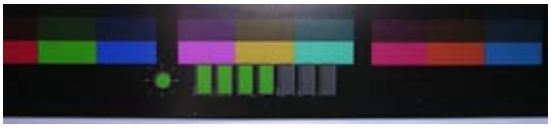

Figure 6-3 LCD Display - Brightness Adjustment

NOTE: The screen Brightness is calibrated when the dark blocks on the left (numbers 1 through 6) and the white bars on the right (numbers 1 through 12) are all visible.

NOTE: It is recommended to adjust the brightness to the lowest possible level, so that the watermark is just visible on the screen - refer to Testing Your Contrast and Brightness Settings, below.

NOTE: For Vivid S6 N systems, it is recommended to activate the automatic screen-adjustment feature for best results. (The Auto Sensor is On by default, unless Brightness and Contrast settings are changed manually).

6-1-2-3 Testing Your Contrast and Brightness Settings

Observe the **V** watermark on the lower part of the monitor beside the soft keys on the screen. The monitor is set to optimal settings when you just ***start*** seeing the **V**.

Figure 6-4 LCD Display - V Watermark Adjustment

- If you do not see the **V**, the monitor is set too dark.
- If the **V** is clearly visible, the monitor has too much contrast or is set too bright.

The Test Pattern in the Calibration Screen (refer to Figure 6-1 on page 6-2) may be used for Advanced Settings. (Press Alt + Q to access the Test Pattern).

6-1-2-4 Blue Tint Adjustment Procedure

- **To adjust the Blue Tint:** Rotate the second right rotary knob on the soft menus keys, as required.

  Counterclockwise rotation will ***decrease*** the blue tint level.

  Clockwise pressing will ***increase*** the blue tint level.

- To assist in making blue tint adjustments, an adjustment bar is displayed below the screen:

Figure 6-5 LCD Display - Blue Tint Adjustment

- Exit the Calibration Screen by pressing on <**TestPattern**> from the soft menu keys and then on the <**F4**> key (also labeled <**LCD**>).

6-1-2-5 Autosensor Adjustment Procedure for Vivid S6 N only

- **To adjust the monitor automatically by using light sensors:**
  Press on the <**AutoSensor>** button on the soft menu keys.
- Exit the Calibration Screen by pressing on <**TestPattern**> from the soft menu keys and then on the <**F4**> key (also labeled <**LCD**>).

6-1-2-6 Display Type Setup

The display type should be set each time one of the following procedures is performed:

- LCD replacement - see “Monitor Replacement Procedure” on page 24
- Hard Disk format - see “Hard Disk Replacement Procedure” on page 112
- BEP replacement - see “BEP Replacement Procedure” on page 115

To set the LCD Type:

1) Plug the service dongle into one of the USB ports.
2.) Boot-up the system in Maintenance mode and login.
3.) Go to the following directory in My Computer: **C:\Almog\target\bin**.
4.) Run **SetLCDType.exe** by double-clicking on it. This opens the **Set LCD Type** screen.

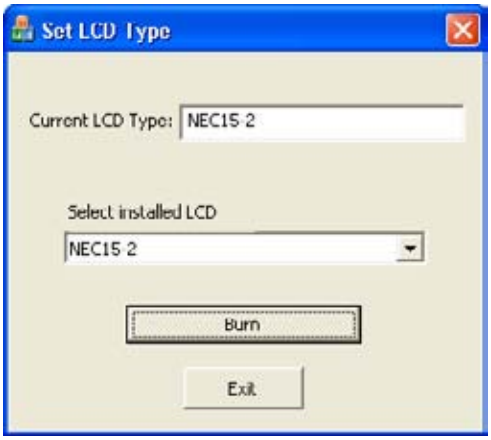

Figure 6-6 Set LCD Type Screen

5.) In the *Select installed LCD* drop-down, select the correct device type as follows:
- For **Vivid S6 N**, select **Hitachi 17-3**
- For **Vivid S5 N**, select **NEC 15-2**

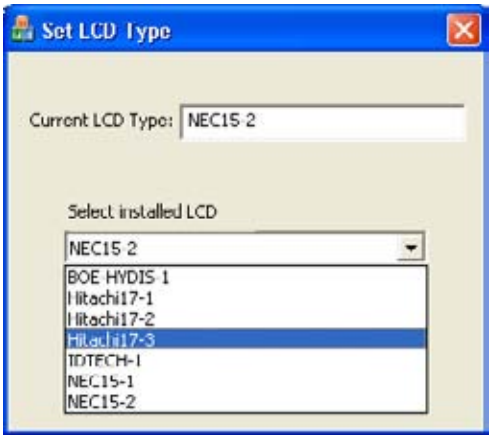

Figure 6-7 LCD Type Drop-down List of Different Device Types

6-1-2-6 Display Type Setup (cont'd)

6.) Press the **Burn** button to Burn the screen and set the system LCD type.

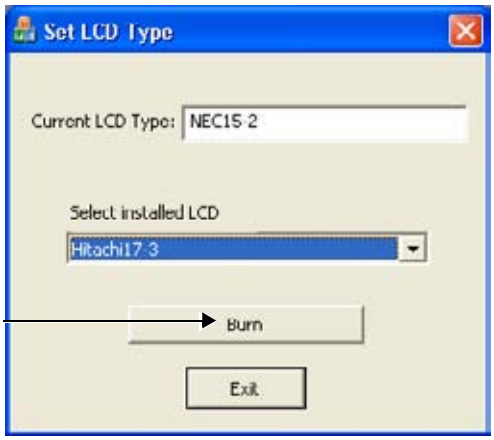

Figure 6-8 Activating the Burning Process

If the process succeeded, the following screen appears without any message:

Figure 6-9 Setting LCD Type Successful

6-1-2-6 Display Type Setup (cont'd)

If the process failed, then the following pop-up message appears:

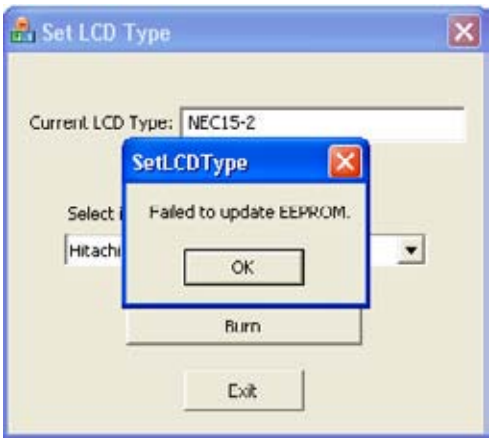

Figure 6-10 Setting LCD Type Failed

a.) Press **OK** to continue.
b.) Check the selected LCD and the LCD connection.
c.) Try to burn the device again.

7.) Verify that the **Current LCD Type:** field is identical to the **Select installed LCD** field.

8.) Proceed to perform the following functionality tests:
- 4-3-1-6 "Monitor Test" on page 4-21
- For Vivid S6 N systems only:
4-3-1-5 "Light Detector Test for Vivid S6 N only" on page 4-21

6-1-3 Keyboard Adjustments

6-1-3-1 Backlighting Intensity Adjustment Procedure

To make adjustments to the Keyboard Backlighting intensity, follow the procedure described in 3-6-3-3 "Adjust Keyboard Backlight Intensity" on page 3-67.

6-1-4 Trackball Speed Setting

NOTE: The following procedure is required whenever performing a software upgrade.

By default, when upgrading the software from *7.1.0 Build 83* to *7.2.0 Build 100*, the trackball speed is reset to the default system setting.

Before performing a software upgrade procedure, observe the current trackball speed setting. The same trackball speed setting will be required, after completion of the upgrade. This is set as described in the procedure below.

The following is the procedure for setting the correct trackball speed:

1.) From the Windows® **Start** button, select **Settings** > **Control Panel**.
2.) From the **Control Panel**, double-click **Mouse.**
3.) Select the **Pointer Options** tab.

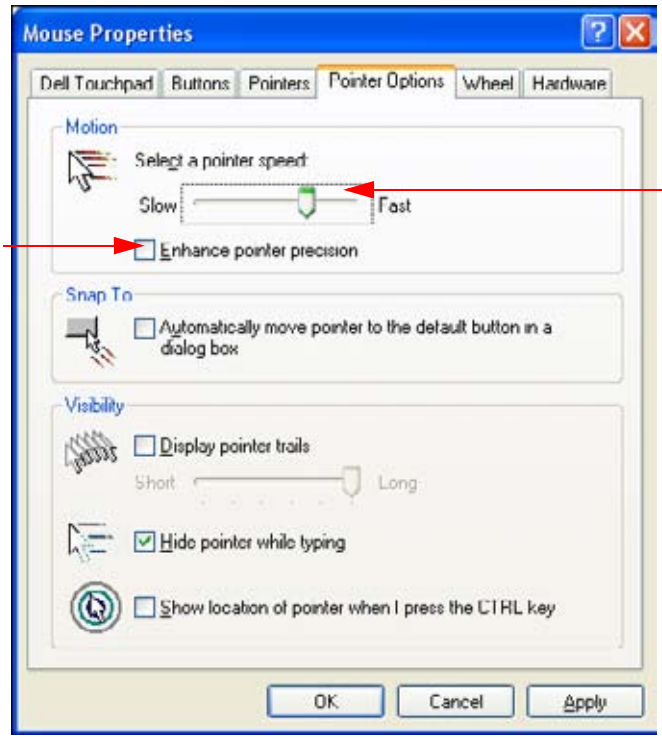

Figure 6-11 Checking the Pointer Speed Prior to a Software Upgrade

4.) Under **Motion**, note the pointer speed.
5.) After completing the software installation (as described in the “Software Installation/Upgrade Procedure Overview” on page 174), reset the pointer speed to the setting as noted in step 4, above.
6.) Verify that the **Enhance pointer precision** box is not checked.

6-1-5 Beamformer Calibration

6-1-5-1 Beamformer Calibration Procedure

For details on Beamformer Calibration adjustments, refer to *Chapter 7* - Diagnostics/Troubleshooting.

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Chapter 7
Diagnostics/Troubleshooting

Section 7-1
Overview

7-1-1 Purpose of Chapter

This chapter describes how to set up and run diagnostic tools to locate system problems and failures. The Vivid S5 N and Vivid S6 N ultrasound units includes built-in diagnostic tools that can be accessed from the scanner application.

Table 7-1 Contents in Chapter 7

Section	Description	Page Number
7-1	Overview	7-1
7-2	Diagnostics	7-2
7-3	Performing Full System Diagnostics	7-18
7-4	Performing Front End (FE) Diagnostics	7-23
7-5	Monitoring Tests	7-86
7-6	Performing Back End Diagnostics on the System	7-108
7-7	Automatic Error Log	7-127

Section 7-2
Diagnostics

7-2-1 Diagnostic Tools

The diagnostic tools are provided for checking the system which includes the power supply, temperature, fan operation, board functions, Back-end signal processing performance, keyboard operation, peripherals, and so on.

7-2-2 Diagnostic Procedure Summary

The diagnostic tools are used to identify and correct problems, as follows:

- When the system boots up, it loads all the required drivers and establishes communication with the front board, via the PCI bus. Check the system presets to verify that good unit performance can be achieved.
- When the Back End is operating, you can verify proper voltages and temperatures in the Front End and in the Power Supply. To check the Front End parts, the tests must follow a logical sequence, in order to identify the faulty component. For example, testing communication between the Front End and the Back End begins by testing the RFI board and the PCI bus, before testing all the other boards, *in the following sequence* (as applicable):
    * RFI board, TR32 boards, Probe Interface board and Probe Select board
- Many error messages are displayed due to minor changes in calibration that may occur during normal operation. Before performing diagnostic tests, perform calibration, as described in the subsection 7-4-2-1 "DC Offset Calibration" on page 7-24.
  If error messages are displayed after performing calibration, perform the Front End diagnostics described in Section 7-4 "Performing Front End (FE) Diagnostics" on page 7-23.

7-2-3 Accessing the Diagnostic Test Window

The diagnostic tools are accessed from 2D-Mode by simultaneously pressing **<ALT+Config>** on the alphanumeric keyboard. The *Diagnostic Test* window is displayed, as shown below:

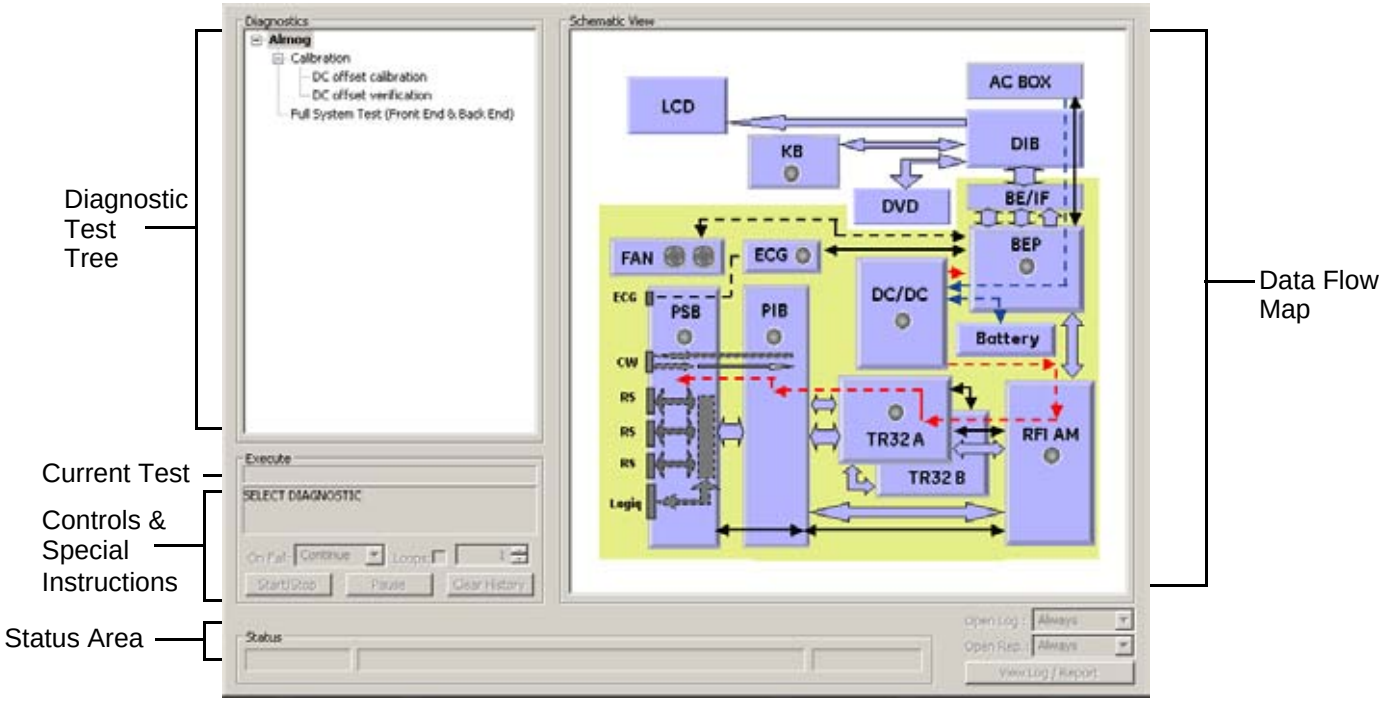


Figure 7-1 Diagnostic Test Window

NOTE: For a summary of the various Diagnostic Test Menu options, together with details of the information displayed in different areas of the screen, see Table 7-2 on page 7-4 and 7-2-4 "Diagnostic Test Window Menu Options" on page 7-9.

NOTE: When performing a specific test for an intermittent problem, it is highly recommended to use the Loop option (use the combo box or type the required number of loops) as appropriate. Looping the test will assist in detecting the problem.

NOTE: Once the test has been completed, a log can be viewed, as described in the 7-2-3-1 "View Log" on page 7-5.

The *Diagnostics Test Window* (Figure 7-1 "Diagnostic Test Window" on page 7-3) comprises the following areas and menu options:

Table 7-2 Vivid S5 N and Vivid S6 N Diagnostics Test Window and Menu Options

Option	Description	Comments
Data Flow Map	Displays a schematic view of the Vivid S5 N or Vivid S6 N data flow (Data Flow map). The functionality of each button in this area corresponds to that of the test of the same name in the Diagnostic Test Tree. You are able to select and perform the Vivid S5 N or Vivid S6 N diagnostic tests by trackballing to the required test (listed in the Diagnostic Test Tree) and pressing **Set**. Note: Double-clicking a button in the Data Flow Map expands the corresponding list of tests (in the Diagnostic Test Tree) available for that component (or group of components).	In the Data Flow map Status Window, status indicators are highlighted by color, indicating the following: • **Light Blue:** The selected test will be performed on this component, or group of components. • **Light Gray:** This component, or group of components will be *excluded* from the test/s. • **Green:** All recommended tests for these components have been completed and no problems were identified. • **Red:** At least one problem was identified in these components during the performance of the test. • **Yellow:** The tests executed so far on these components have passed, but not all recommended tests have been performed.
Diagnostic Test Tree	Displays a menu of diagnostic test sequences and tests available for selection.	
Execute	Displays the name of the currently-selected diagnostic test (or test sequence).	
Controls and Special Instructions	Displays any special instructions for checks required before performing the test. For example, *Make sure system is calibrated. Disconnect probe and press **Start***.	The area also includes these controls: • a **Start/Stop** button used to commence a test. After pressing Start, the button may be used to stop a test before completion. • a **Pause** button used to pause a test before resuming. • a **Clear History** button used to clear the highlighted status indication in the Data Flow map (schematic view). Note: this button is not used to clear the test sequence log files (refer to Clear Log button in Table 7-3 on page 7-5). • an **On Fail** combo box - used to select the action required in the event that the test fails (Stop or Continue**)**. • a **Loops** checkbox. If activated, the test will be repeated for the selected number of loops.
Status Area	Displays instructions during the test, as well as test status and result messages.	The following messages are displayed: • **Test status:** For example, **Ready for test, Executing,** or **Finished.** • **Instructions:** During the course of a diagnostic test, any instructions to the user are displayed in the Status area. For example, **Wait.** • **Test results:** For example, **Passed** or **Failed**. The area also includes two progress bars: • **Progress bar:** Shows progress of an individual test (within a sequence of tests). The area also includes: • a **View Log** button used to review the test results. (Enabled only after test execution). Refer to 7-2-3-1 "View Log" on page 7-5.

7-2-3-1 View Log

From the *Diagnostics Test Window* (Figure 7-1) the View Log button provides access to the test result information described below.This is shown in the View Log dialog box (see example in Figure 7-2 below) which is displayed in the *upper* right portion of the screen (over the Data Flow Map area).

Table 7-3 Vivid S5 N and Vivid S6 N Diagnostics Test Window - View Log 1 of 2

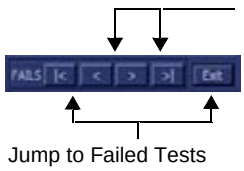
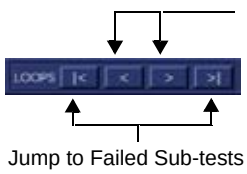
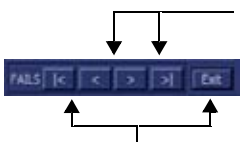
Option	Description	Comments
File	Log file number	
Date	Date test was performed.	
Time	Time test was executed.	
Log File Scroll Bar and Arrows	Enables scrolling through the list of Log Files	
Tests	Displays test sequence log files. Shows a list of the specific diagnostic test/s included in the currently-selected test sequence.	
Result	Lists test results as either PASS or FAIL.	
Loop	Lists name of loop and the sub-tests within the loop	
Date	Date test was performed.	
Tests Scroll Bar and Arrows	Enables scrolling through the list of Test Log Files.	A test sequence may have up to four reports. Since only one specific test may have failed, the scroll arrows enable jumping directly from one Failed test to the next (i.e., failures only). Alternatively, you can scroll through all the tests (one-by-one). 
Loops Scroll Bar and Arrows	Enables scrolling through the Loops and sub-tests.	A test may have many loops, each of which may have sub-tests. Since only one specific sub-test may have failed, the scroll arrows enable jumping directly from one Failed sub-test to the next (i.e., failures only). Alternatively, you can scroll through all the loops (one-by-one). 

Table 7-3 Vivid S5 N and Vivid S6 N Diagnostics Test Window - View Log (cont'd) 2 of 2

Option	Description	Comments
Reports	Displays the specific report (or list of reports) for the currently-selected test sequence. (shows all OK and failed tests) Certain tests will have more than one report (see the example in *Figure 7-2 - View Log Dialog Box*).	Double-clicking on a currently-selected report displays that report in the Report window (lower portion of the View Log dialog box) - refer to Figure 7-3 "ADC Test - Viewing Report (Test Signal Amplitude 2nd Harmonic)" on page 7-8.
Reports Scroll Bar and Arrows	Enables scrolling through the list of Reports	A test sequence may have up to four reports. Since only one specific test may have failed, the scroll arrows enable jumping directly from one Failed test report to the next (i.e., failures only). Alternatively, you can scroll through all the reports (one-by-one). 
Erase Button	Clears all test sequence log files for that specific (currently selected) test listed in the Tests window (passed and failed tests).	It is *not recommended* to clear the test sequence log files unless a test failed due to user intervention or as a result of a false alarm. (It is necessary to erase each log file separately).
Exit Button	Closes the *View Log* dialog box	Returns to the Diagnostic Test window.
Report Window	Lower portion of the View Log dialog box where the the currently-selected report is displayed in a separate window (see the example in Figure 7-2 "View Log Dialog Box" on page 7-7). The displayed *Average*, *Deviation*, *Max* and *Min* values are dynamically updated.	Visible only after test execution.
Report window Scroll Arrows	Enables scrolling through all channels. Displays the currently-selected channel number. For example, Count: 64	
Close Button	Closes the Report window.	

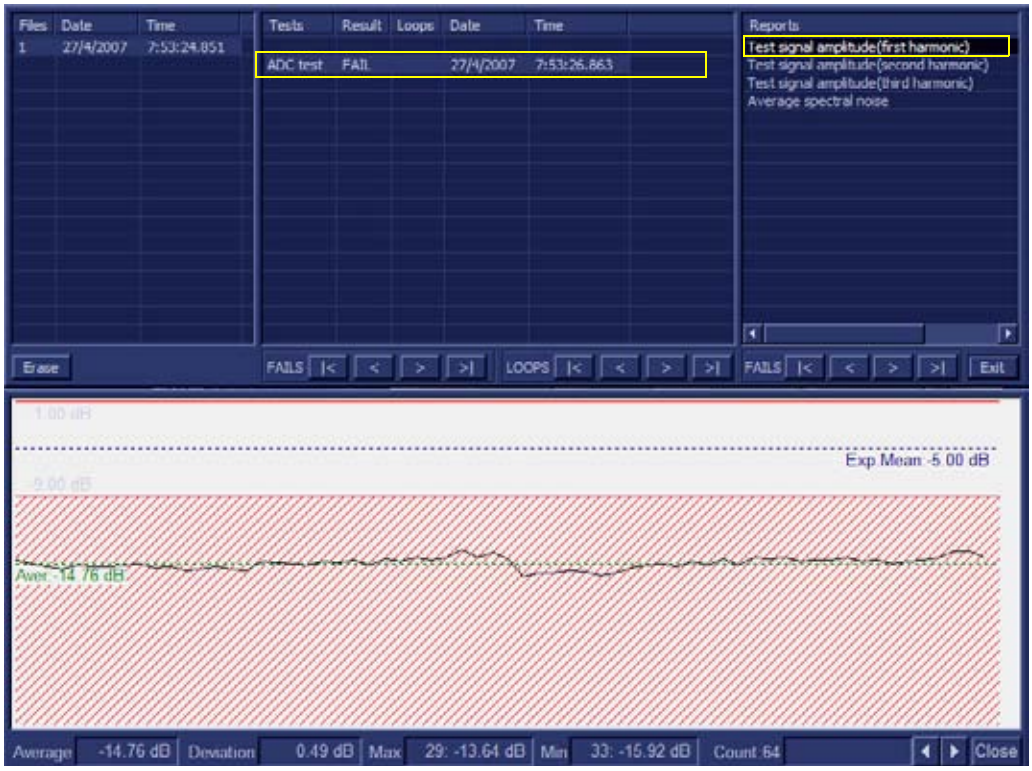


Figure 7-2 View Log Dialog Box

In Figure 7-2 "View Log Dialog Box" on page 7-7 above, the selected report (Test signal amplitude, first harmonic) is displayed in the Report window. When there is more than one report listed, the first report is displayed (by default).

Double-clicking on another report (for example, Test signal amplitude second harmonic), will evoke the display of that report in the Report window as shown in the example in Figure 7-3 "ADC Test - Viewing Report (Test Signal Amplitude 2nd Harmonic)" on page 7-8.

Figure 7-3 ADC Test - Viewing Report (Test Signal Amplitude 2nd Harmonic)

NOTE: Left and right arrows provided in the View Report window enable scrolling between the different channels.
Left-clicking on a currently-selected channel marks a red square on the report graph, and also evokes the display of the following information relative to that specific point: Average, Deviation (standard deviation from the Average), Max, and Min.
The signal should be within the limits marked in the white area (the dotted line represents the Average), as shown in *Figure 7-3 "ADC Test - Viewing Report (Test Signal Amplitude 2nd Harmonic)" on page 7-8**.*

7-2-4 Diagnostic Test Window Menu Options

The *Diagnostic Test* menu includes the options described below.

7-2-4-1 Full System Test

NOTE: The Full System Test requires approximately 10 minutes for completion.

7-2-4-1-1 Full System Test (FE and BEP)

Performs a full sequence of complete Front End and Back End tests (automatically) that do not require user intervention. This is particularly recommended for detecting problems that are intermittent in nature, since a test may be paused at any stage and any detected failures reviewed.

For test procedure instructions, see the 7-3-1-1 "Full System Test (FE and BEP)" on page 7-19.

7-2-4-2 Front End Tests

NOTE: The Front End Tests may be performed in any order. However, due to the functional dependencies between each of the Front End boards, it is recommended to perform the tests on the boards in the following order (as described in the Section 7-4 "Performing Front End (FE) Diagnostics" on page 7-23):

1.) RFI board
2.) TR32 boards
3.) PIB board
4.) PSB board

Performing the tests in the proper sequence will help to derive the correct conclusions regarding the source of the problem.

7-2-4-2-1 Calibration

- **DC Offset Calibration**

  This is used to test proper operation of the Beamformer, and TR32A and TR32B boards. The test generates no signal at the input to the Beamformer and is used to calibrate the system, or to test system calibration in order to check that the current calibration values are valid for the current environment.
  For test procedure instructions, see the 7-4-2-1 "DC Offset Calibration" on page 7-24.

- **DC Offset Verification**

  This test verifies that the calibration saved on the Hard Disk is within acceptable limits.
  For test procedure instructions, see the 7-4-2-2 "DC Offset Verification" on page 7-27.

7-2-4-2-2 RFI Tests

- **Full RFI Test**

  The Full RFI Test performs a complete test sequence and includes all the RFI board tests (described below).
  For test procedure instructions, see the 7-4-3-2 "Full RFI Test" on page 7-30.

- **RFI FE Cache Test**

  Tests the cache memory. (The cache memory for the PM, TR32A, TR32B and the RFI boards is located on the RFI board). This test sends a specific pattern into the cache memory and the expected result is to see a predefined pattern as the output from the cache memory.
  For test procedure instructions, see the 7-4-3-3 "RFI FE Cache Test" on page 7-32.

- **RFI Analog Circuits Test**

  This tests the RFI analog circuitry (which is responsible for temperature monitoring and communication with the TEE probe).
  For test procedure instructions, see the 7-4-3-4 "RFI Analog Circuits Test" on page 7-35.

- **RFI Demodulator Short Test**

  This is used to perform a short digital test on the demodulator to make sure that the demodulator on the FPGA is functioning in accordance with the specifications.
  For test procedure instructions, see the 7-4-3-5 "RFI Demodulator Short Test" on page 7-38.

- **RFI Audio Test**

  This tests the audio frequency for Doppler sound (coming from the RFI board to the Back End). During this test - approximately midway on the progress bar - a loud, high-pitched sound will be heard coming from the speakers.
  For procedure details, see the 7-4-3-6 "RFI Audio Test" on page 7-41.

NOTE: To conduct a complete audio test of the system, it is also necessary to perform an audio test which is part of the Back End - for details, refer to the 7-2-4-4-1 "PC Doctor" on page 7-15.

7-2-4-2-3 TR32 Tests

- **Beamformer Tests**

  - **TR32 BF Digital Test**

    This is an internal test of the Beamformers. Each Beamformer generates an internal test pattern (first on the TR32A board and then on the TR32B board). This test pattern is generated through MLA0 and MLA1 to the RFI.

    Therefore, in the first phase of the test, the Beamformer on the TR32A board generates a test pattern signal (while TR32B generates pattern *zero*).

    In the second phase of the test, the Beamformer on the TR32A board generates a test pattern *zero* - while the BF on the TR32B board generates a test pattern signal.

    Both the test patterns are summed and focused on the BF 32A and generated to the RFI demodulator.

    For test procedure instructions, see the 7-4-4-2-1 "TR32 BF Digital Test" on page 7-44.

  - **System BF Digital Test**

    In this test, both Beamformers are generating internal test patterns. The patterns from the BF of the TR 32B board are summed and focused in the BF of the TR32A board. From here, the pattern is generated through MLA0 and MLA1 to the RFI.

    For test procedure instructions, see the 7-4-4-2-2 "System BF Digital Test" on page 7-47

  - **ADC Test**

    The ADC Test is used to check that 1st harmonic, 2nd harmonic, 3rd harmonic, and background noise are within pre-defined limits.

    In this test, a signal is generated from the RFI into the TR switches. For all 64 channels of the system, each signal goes through the following: pre-amplification, filtering, analog-to-digital conversion, and focusing. The test signal is at a frequency of 2 MHz.

    For test procedure instructions, see the 7-4-4-2-3 "ADC Test" on page 7-50.

- **Receive (RX) Tests**

  - **RX Test**

    The RX Test is performed with no probe connected. This is used to check that the signal values at the input to the TR32 board are as expected.

    When performing the RX Test, test signals are generated from the RFI, and the results are expected to be of fairly high amplitudes with no distortion of the frequency.

    For test procedure instructions, see the 7-4-4-3-1 "RX Test" on page 7-55.

7-2-4-2-4 PIB Tests

- **ACW Test**

  - **ACW IQ Symmetry Test**

    The ACW (analog CW test) is performed when CW problems are suspected. Checks the symmetry of I and Q signals. Inputs a test signal shifted from the mixer frequency, then calculates the RMS of the I and Q vectors and compares them. The RMS vectors should be lower than the defined limits (shown on the report).

    For test procedure instructions, see the 7-4-6-2-1 "ACW IQ Symmetry Test" on page 7-60.

  - **ACW Matrix Test**

    The ACW (Analog CW) Matrix Test checks the path of all 32 RX channels to all VCA outputs on the TR32B board. A test signal shifted from the mixer frequency is generated and the receive signal amplitude and frequency is then checked. The frequency should be matched to the frequency shift of the input signal (shown on the Test report).

    For test procedure instructions, see the 7-4-6-2-2 "ACW Matrix Test" on page 7-63.

  - **ACW Delay Range Test**

    The ACW (Analog CW) Delay Range Test checks the path of VCA outputs to the Delay taps in all three frequency ranges. The expected results are shown on the Test report.

    For test procedure instructions, see the 7-4-6-2-3 "ACW Delay Range Test" on page 7-68.

  - **ACW Pre-Mixer Gain Test**

    The ACW (Analog CW) Pre-Mixer Gain Test checks the PM Gain level. A test signal shifted from the mixer frequency is generated and the test compares the 0db RMS to the levels of the other Gains. The RMS level is expected to be lower than the selected Gain level (as shown on the Test report).

    For test procedure instructions, see the 7-4-6-2-4 "ACW Pre-Mixer Gain Test" on page 7-72.

  - **ACW BPF Test**

    The ACW (Analog CW) BPF Test is used to check the operation of all the Bend Pass filters. A test signal is shifted from the mixer frequency and then the test checks the filter response. Attenuation of the filters in different frequencies should be within pre-defined limits (shown on the Test report).

    For test procedure instructions, see the 7-4-6-2-5 "ACW BPF Test" on page 7-74.

  - **ACW HPF Test**

    The ACW (Analog CW) HPF Test is used to check the operation of the High Pass Filters (300Hz and 600 Hz). A test signal is shifted from the mixer frequency and then the test checks the filter response. Attenuation of the filters in different frequencies should be within pre-defined limits (shown on the Test report).

    For test procedure instructions, see the 7-4-6-2-6 "ACW HPF Test" on page 7-80.

- **Pencil Test**
  - **Pencil Rx Test**

    When performing the Pencil Rx Test, no probes or jig are connected to the system.

    This test is performed to check the receive functions. During this test, signals are transmitted through the circuitry. The received frequency should match the transmitted test frequency, as shown in the Test report.

    For test procedure instructions, see 7-4-6-2-7 "Pencil Rx Test" on page 7-83.

7-2-4-3 Monitoring Tests

7-2-4-3-1 Full System Monitoring Test

The Full System Monitoring Test performs a full sequence of all monitoring tests (as described below).

For test procedure instructions, see 7-5-1-1 "Full System Monitoring Test" on page 7-86.

7-2-4-3-2 Fixed Voltages Test

The Fixed Voltages Test is used to check the Power Supply unit and to ensure that voltages are within the pre-defined limits.

For test procedure instructions, see 7-5-1-2 "Fixed Voltages Test" on page 7-93.

7-2-4-3-3 Temperatures Test

The Temperatures Test is used to check the temperature of the Front End and the Back End. The test reads all the temperature sensors in the system to ensure that the system is operating within the pre-defined temperature limits and that there is no overheating of any components.

For test procedure instructions, see 7-5-1-3 "Temperatures Test" on page 7-95.

7-2-4-3-4 Fans Speed Test

The Fans Speed Monitoring Test is used to check that the Fan Controller is fully operational and that both fans operate simultaneously (at the pre-defined speed) to maintain proper cooling and the optimum operating temperature of all system components.

For test procedure instructions, see 7-5-1-4 "Fans Speed Test" on page 7-98.

7-2-4-3-5 Fans Speed Setting Test

The Fans Speed Setting Test is used to check that the Fan Controller is fully operational (in three modes: *stop; mid-speed; max speed*) and that both fans operate simultaneously (at the pre-defined speed) to maintain proper cooling and the optimum operating temperature of all system components.

For test procedure instructions, see 7-5-1-5 "Fans Speed Setting Test" on page 7-100.

7-2-4-3-6 Battery Parameters Test

The Battery Parameters Test is used to check the battery status with regard to the following:

- Battery capacity
- Charging voltage being supplied to the battery (or the voltage being supplied by the battery)
- Source of the power being provided to the system (i.e. external power via the AC/DC or via the battery [indicating the battery is either being charged or discharged]).

For test procedure instructions, see 7-5-1-6 "Battery Parameters Test" on page 7-103.

7-2-4-3-7 Tx Voltages Test

The TX Voltages Test is used to test the transmit part of the power supply to make sure that the Tx voltage is within expected values.

For test procedure instructions, see 7-5-1-7 "Tx Voltages Test" on page 7-105.

7-2-4-4 BEP Tests

The BEP Tests are performed to check of the various Back End hardware components, as outlined below. The procedures are described in detail in the Section 7-6 "Performing Back End Diagnostics on the System" on page 7-108.

7-2-4-4-1 PC Doctor

The PC Doctor Tests are divided into two main groups: *Automatic* and *Interactive.* The automatic tests do not require user intervention. The procedure instructions for both groups are provided in 7-6-1-1 "PC Doctor" on page 7-109.

- **Automatic**

  - **Full Back End Test without Hard Disk**

    This test performs a full system check without a Hard Disk scan. The test sequence includes all automatic tests (excluding the Hard Disk. For test procedure instructions, see 7-6-1-1-1 "Full Back End Test w/o Hard Disk Scan" on page 7-109.

  - **Full PC Doctor Test (50 min)**

    The Full PC Doctor Test requires 50 mins (longer than the Full Test without Hard Drive). This test performs a full system check as well as a Hard Disk scan. The test sequence includes all automatic tests (including the Hard Disk).

    For test procedure instructions, see 7-6-1-1-2 "Full PC Doctor Test (50 min)" on page 7-112.

  - **CPU Tests**

    The CPU Tests are used to perform a variety of CPU checks, as described below.

    For test procedure instructions, see 7-6-1-1-3 "CPU Tests" on page 7-114

    - **CPU Full Test:** Performs a battery of tests on the CPU to ensure that it is working properly. All the remaining tests are performed as part of the CPU Test.
    - **CPU Registers:** Tests the CPU Registers using the default test patterns. On 32 bit CPUs, the extended registers are also checked. If errors are detected, the failed registers are listed.
    - **CPU Arithmetics:** Tests the proper function of the arithmetic commands ADC, ADD, DEC, DIV, IDIV, IMUL, INC, MUL, SBB and SUB with 16 and 32 bit operands. If errors are detected, the failed commands and operands are listed.
    - **CPU String Operations:** Tests the proper operation of the string commands LODS, MOVS, SCAS and STOS with 8, 16 and 32 bit operands. If errors are detected, the failed commands and operands are listed.
    - **CPU Logical Operations:** Tests the proper operation of the logical operations AND, NOT, OR and XOR with 16 and 32 bit operands. If errors are detected, the failed operands are listed.
    - **CPU Math Registers:** Tests the coprocessor register stack, pointers and commands FLDLZ, FLDPI, FLDLN2, FLDLG2M FLDL2T FLDL2E and FLD1. If errors are detected, the failed steps and commands are listed.
    - **CPU Math Commands:** Tests the coprocessor commands FBLD/FBSTP, FLD/FST, FXCH, FCOM, FICOM, FTST, FXAM and FUCOM. If errors are detected, the failed instructions are listed.
    - **CPU Transcendental:** Tests the coprocessor transcendental commands F2XM1, FPATAN, FPTAN, FYL2XP1, FCOS, FSIN and FSINCOS. If errors are detected, the failed commands are listed.
    - **CPU MMX Arithmetic:** Tests the MXX commands PADD, PSUB, PMUL and PMADD. If errors are detected, the failed commands are listed.
    - **CPU MMX Logical:** Tests the MXX commands PAND, PANDN, POR and PXOR. If errors are detected, the failed commands are listed.

- **CPU MMX Shift:** Tests the MXX commands PSLL and PSRL. If errors are detected, the failed commands are listed.
- **CPU MMX Data Transfer:** Tests the MXX commands MOVD and MOVQ. If errors are detected, the failed commands are listed.
- **CPU MMX Misc.:** Tests the MXX commands PCMPEQ, PCMPGT, PACKSS, PACKUS and PUNPCK. If errors are detected, the failed commands are listed.

- **HD Test**

  The HD Tests are used to perform a variety of Hard Drive checks, as described below.

  For test procedure instructions, see the 7-6-1-1-4 "HD Test" on page 7-117.

  - **Hard Drive Full Test (w/o Scan):** Performs a battery of tests to examine the hard drive and ensure that it can perform all its functions. All the remaining tests are performed on the hard drive to ensure that the hard disk controller and the drive mechanism are working correctly. The disk surface itself is also checked. This test may take 3.5 minutes.
  - **Hard Drive Linear Seek:** Moves the hard disk drive heads from track 0 to the maximum track one track at a time.
  - **Hard Drive Funnel Seek:** Moves the hard disk drive heads in a funnel fashion (from the first track to the last, then to the second track, the second last track, the third track and so on).
  - **Hard Drive Surface Scan:** Scans the surface for defects on the hard disk drive.

- **Memory Test**

  The Memory Tests are used to perform a variety of memory checks, as described below.

  For test procedure instructions, see the 7-6-1-1-5 "Memory Test" on page 7-119.

  - **Full Memory Test:** Uses 18 test patterns to test memory locations. If errors are detected, the address of the block in which the error was detected is shown. During testing, these diagnostics will also look for parity errors and other exceptions. If encountered, these are added to the test log as errors.
  - **Memory Pattern Test:** Uses several test patterns to test as much memory as possible.
  - **Memory Parity Test:** Checks for parity errors on the memory bus during intensive string transfer operation. If an error is detected, the address of the failed block is displayed.

- **Video Test**

  The Video Tests are used to perform a variety of video diagnostic tests, as described below. These tests use 18 test patterns to fill the video buffer, testing your graphics acceleration and text output

  For test procedure instructions, see the 7-6-1-1-6 "Video Test" on page 7-121.

  - **Full Video Test:** Test the system's video capabilities. This involves testing the memory, testing the graphics acceleration and testing the text output. You can follow the tests being performed on the monitor. This test can be cancelled at any time by pressing <**Esc**> on the keyboard.
  - **Video Memory:** Tests the video memory by filling the video buffer with 18 test patterns, one pattern at a time. These tests fill the entire screen with a single color.

- **Video Data Transfer:** Tests the graphics acceleration part of the video controller. This test fills the screen with black and white concentric squares, and rectangles of various sizes and colors. If errors are detected, the locations of the problems are displayed.
- **Video Text Output:** Prints a text string in random sizes and colors to test the video device driver and video controller.

- **PCI Test**

  A Peripheral Component Interconnect (PCI) bus is a fast standard bus that is common in Pentium systems. The PCI Test is performed to ensure that the PCI bus is working up to speed. The motherboard is scanned to verify the configuration space and to ensure that the diagnostics can communicate with the board.

  For test procedure instructions, see the 7-6-1-1-7 "PCI Test" on page 7-123.

- Network Test

  A Network Interface Card (NIC) is a computer circuit board or card that is installed in a computer so that it can be connected to a network. Networks are used by businesses and some home users to connect PCs together so that they can share files and resources. Data travels over a network connection much faster than over standard internet connections.

  The PC Doctor Network Test will reveal that a network card is present without a driver installed. These cards are likely to not show up on a PC's list of network cards available for test. This may cause the test to return a result of "not applicable", meaning no network cards were found. The test may detect other issues such as electrical interference (noise), circuitry damage, loose connectors, and crimped or bad network cables.

  The Network Test will test DSL or cable internet connections, which operate within a network environment. However, this test does not test the DSL or cable modem used for accessing the Internet. Currently, no PC-Doctor test exists for testing cable or DSL modems.

  The Network Communications Test checks if your PC's network card works and if your PC properly communicates over a network. It makes a list of all the remote PCs on the network that the NIC uses and sends information in the form of several "data packets" from the tested PC to the "host" PCs. These "data packets" are then returned by the "host" PCs to the tested PC where the contents of the "data packet" are checked. If too many of the "data packets" fail to get returned or are thrown away because of data corruption, the Network test logs as FAILED.

  For test procedure instructions, see the 7-6-1-1-8 "Network Test" on page 7-125.

Section 7-3
Performing Full System Diagnostics

When performing the automatic Full System Diagnostic tests, it is strongly recommended to start with the **Full System Test (FE and BEP)** - especially if the Vivid S5 N or Vivid S6 N system shows signs of an intermittent problem. As described in this section, the testing sequence can be paused and restarted at any stage, providing a quick and easy method of reviewing any detected faults.

The different types of Full System Diagnostic Tests are described in detail in the 7-2-4 "Diagnostic Test Window Menu Options" on page 7-9. For instructions on performing each of these tests, refer to the following information:

- 7-3-1-1 "Full System Test (FE and BEP)" on page 7-19

7-3-1 Accessing the Full System Diagnostic Options

- In 2D-Mode, press **<ALT +Config>** on the alphanumeric keyboard. The *Diagnostic Test* window is displayed, as shown in Figure 7-1 "Diagnostic Test Window" on page 7-3.

7-3-1-1 Full System Test (FE and BEP)

NOTE: For a description of this test, refer to the 7-2-4-1-1 "Full System Test (FE and BEP)" on page 7-9.

NOTE: The Full System Test (FE and BEP) performs a full sequence of complete system tests (automatically) and requires approximately 20 minutes for completion.

1.) In the *Diagnostic Test* window, trackball to **Full System Test (FE and BEP)** in the list of tests available for selection from the Diagnostic Test Tree (see Figure 7-4 "Full System (FE and BEP) Test" on page 7-19) and press **Set**. The Full System Test (FE and BEP) name is displayed under *Execute*, and all system components are highlighted blue in the Schematic View, as shown below:

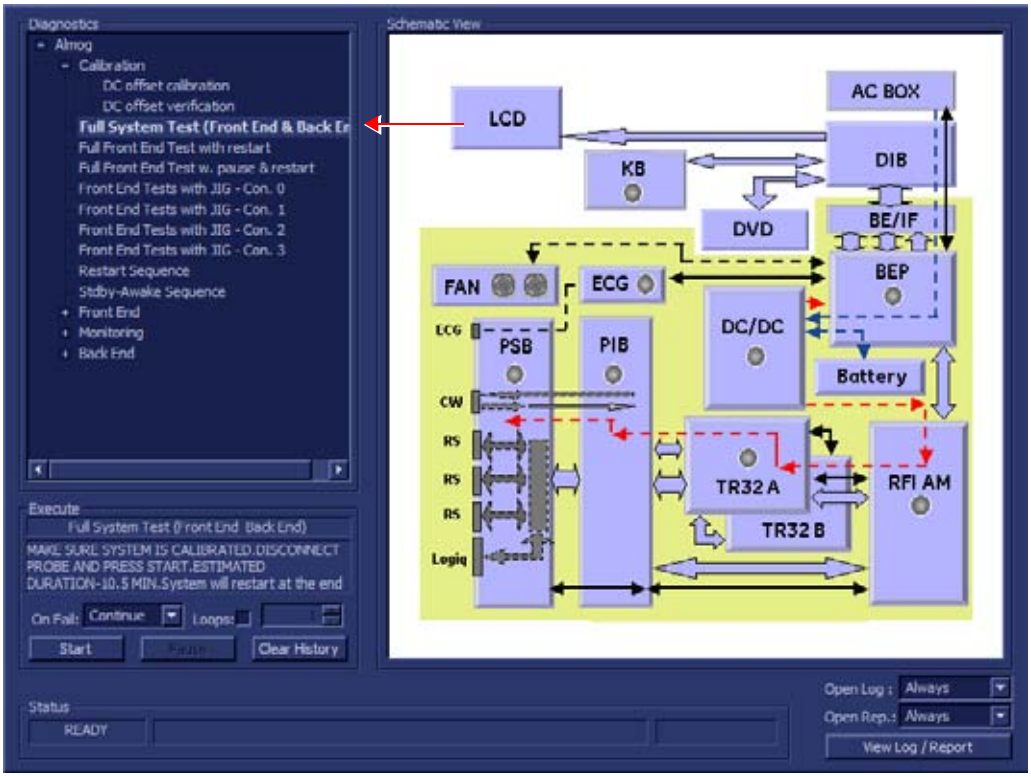


Figure 7-4 Full System (FE and BEP) Test

2.) As indicated in the *Special Instructions* area, make sure the system is calibrated and disconnect any probe currently connected to the system.

7-3-1 Accessing the Full System Diagnostic Options (cont'd)

3.) Under the *Special Instructions* area, activate the **Loops** checkbox and select the required number of *Loops* from the combo box.

4.) Adjacent to *On Fail,* select either **Stop** or **Continue**, as required. Stopping on failure enables you to review a failed test, the moment it fails. Alternatively, you may prefer testing to continue on failure and later you may review the report.

5.) Trackball to the **Start** button and press **Set**.

The Automatic Test Sequence commences. While the sequence of automatic testing or the group of tests proceeds, the name of the test currently in progress (Full System Test FE and BEP) is displayed in the *Execute* field and the current *Loop #* and specific test are shown below. The messages *Init Done* and *Please Wait* are displayed beside the progress bars in the *Status* area:

As the testing sequence progresses, the progress bar will advance to reflect the test progress. Status indicators in the Data Flow map corresponding to the various system components will be highlighted in the appropriate color to indicate the current test status, as follows:

- **Green:** All recommended tests for these components have been completed and no problems were identified.
- **Red:** Problems were identified in these components during the performance of the test.
- **Yellow:** The tests executed so far on these components have passed, but not all recommended tests have been performed.

6.) At any stage, trackball to the **Pause** button and press **Set**, if required.

7.) To resume testing (from the point where you paused), trackball to the **Start** button and press **Set**.

When the Full System Test (FE and BEP) sequence is complete:

- the *Diagnostic Test* window displays the Finished message
- the View Test Log window opens automatically, listing all tests performed and showing details of which tests passed or failed, as shown in the example in Figure 7-5 "View Test Log - Full System Test (BEP and FE)" on page 7-21.

7-3-1 Accessing the Full System Diagnostic Options (cont'd)

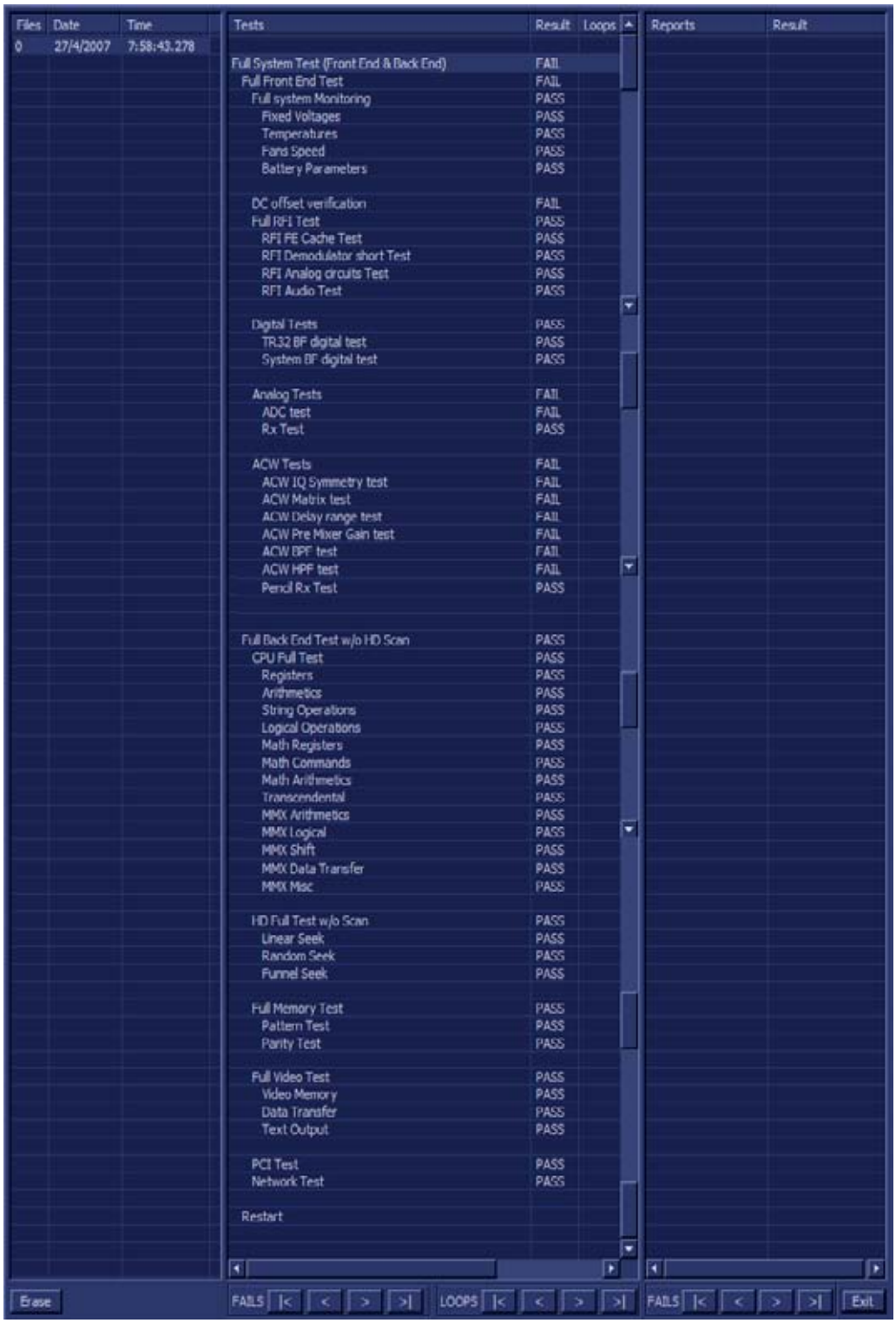


Figure 7-5 View Test Log - Full System Test (BEP and FE)

7-3-1 Accessing the Full System Diagnostic Options (cont'd)

8.) If necessary, use the scroll bars and/or arrows to scroll through the list of *Test* results.

9) After reviewing the test results, proceed as follows:

- If no problems were identified, it is recommended to re-boot the system (this is obligatory when prompted).
- If no problems were identified but the problem persists, contact your local GE HEALTHCARE field engineer for assistance.
- If errors were identified but the results were marginal, perform calibration, as described in "DC Offset Calibration" on page 7-24, and then repeat the test.
- If errors were identified and the results were not marginal, verify that all system cables and boards are connected (not misplaced) and functioning properly, as described in *Chapter 5 - Components and Function (Theory)*.

  If the problem persists, this indicates that either the specific board you tested is faulty or that another board that supports the operation of that board is faulty. Contact your local GE HEALTHCARE field engineer for assistance.

10.) Trackball to the **Exit** button and press **Set** to close the *View Test Log* dialog box.

11.) Press the <**Esc**> button on the keyboard to close the Diagnostic *Test Window*.

Section 7-4
Performing Front End (FE) Diagnostics

*NOTE: When performing Front End Diagnostic tests, it is strongly recommended to start with the **Full System Test (FE and BEP)** especially if the system shows signs of an intermittent problem. (For details, see 7-3-1-1 "Full System Test (FE and BEP)" on page 7-19).*

The Front End diagnostic tests can be initiated manually and may be performed in any order. However, due to the functional dependencies between each of the Front End boards, it is recommended to perform the tests on the boards in the following order:

1.) RFI board
2.) TR32 boards
3.) PIB board
4.) PSB board

Performing the tests in the proper sequence will help to derive the correct conclusions regarding the source of the problem.

As described in this section, the testing sequence can be paused and restarted at any stage, providing a quick and easy method of reviewing any detected faults. For instructions on performing a specific test, refer to the relevant test in the appropriate sub-sections:

- **Calibration Tests**, as described in the 7-4-2 "Calibration Tests" on page 7-24.
- **RFI Diagnostic Tests**, as described in the 7-4-3 "Radio Frequency Interface (RFI) Diagnostic Tests" on page 7-30.
- **TR 32 Diagnostic Tests**, as described in the 7-4-4 "TR 32 Diagnostic Tests" on page 7-44.
- **Probe Interface Board Diagnostic Tests**, as described in the 7-4-5 "Probe Interface Board Diagnostic Tests" on page 7-59.
- **Probe Select Board Diagnostic Tests**, as described in the 7-4-6 "Probe Select Board Diagnostic Tests" on page 7-60.

NOTE: If the system must be re-booted, do so. Continue testing from the point at which you were required to reboot. If a failure occurs, re-boot the system and test again to verify the outcome of the test.

7-4-1 Accessing the Front End Diagnostic Options

- In 2D-Mode, press **<ALT +Config>** on the alphanumeric keyboard. The *Diagnostic Test* window is displayed, as shown in Figure 7-1.

7-4-2 Calibration Tests

7-4-2-1 DC Offset Calibration

*NOTE: When performing the DC Offset Calibration Test, always make sure that the cabinet cage assembly is in the **CLOSED** position.*

NOTE: The DC Offset Calibration Test requires up to 10 minutes for completion.

NOTE: For a description of this test, refer to the information provided in "DC Offset Calibration" on page 7-10.

NOTICE **IMPORTANT** In order to access an individual board test, it is necessary to insert the service dongle from system boot-up and enter the Service Password.

NOTE: When performing this test, no probe should be connected to the system and nothing should be touching the probe connectors!

1.) In the *Diagnostic Test* window, trackball to **DC Offset Calibration** in the list of *Front End* tests available for selection from the Diagnostic Test Tree (see Figure 7-6 "DC Offset Calibration Test" on page 7-24) and press **Set**. The DC Offset Calibration name is displayed under *Execute;* the relevant system components to be tested are highlighted light blue in the Schematic View (PIB, PSB, TR32 and RFI boards) as shown below:

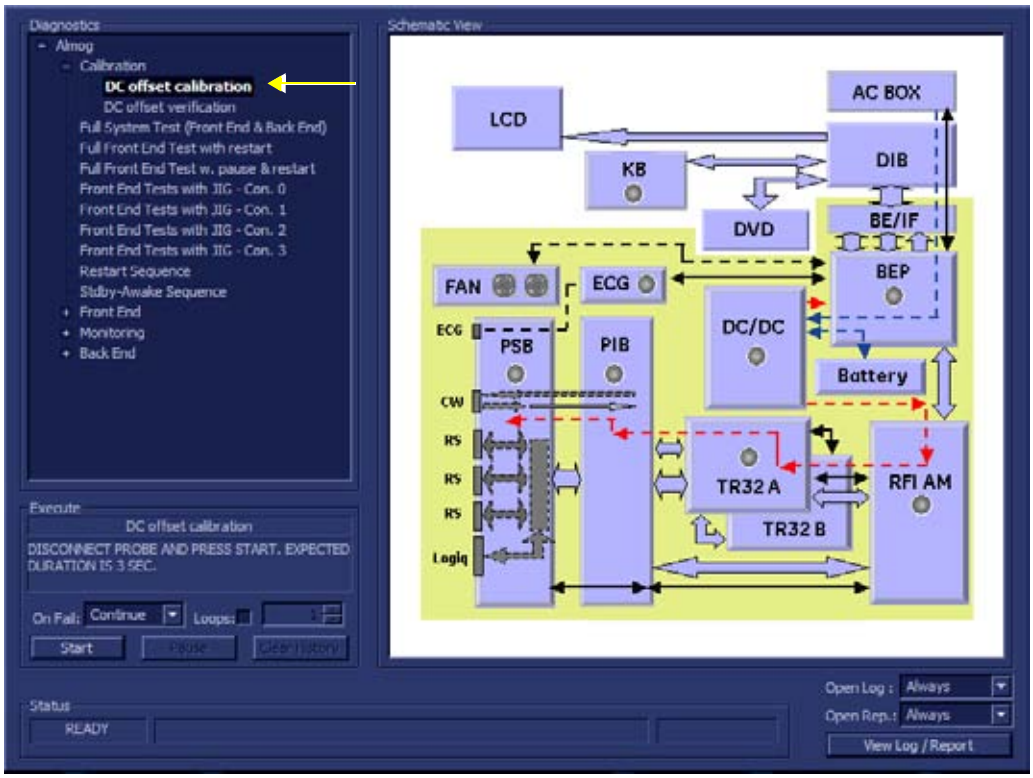


Figure 7-6 DC Offset Calibration Test

7-4-2 Calibration Tests (cont'd)

2.) As indicated in the *Special Instructions* area, disconnect any probes currently connected to the system and make sure that nothing is touching the probe connectors.

3.) Under the *Special Instructions* area, activate the **Loops** checkbox and select the required number of *Loops* from the combo box.

4.) Adjacent to *On Fail,* select either **Stop** or **Continue**, as required. Stopping on failure enables you to review a failed test, the moment it fails. Alternatively, you may prefer testing to continue on failure and later you may review the report.

5.) Trackball to the **Start** button and press **Set**.

The DC Offset Calibration Test commences. While the test proceeds, the name of the test currently in progress (DC Offset Calibration) is displayed in the *Execute* field and the current *Loop* # and specific test are shown below. The messages *Init Done* and *Please Wait* are displayed beside the progress bar in the *Status* area:

As the testing sequence progresses, the progress bar will advance to reflect the test progress. Status indicators in the Data Flow map corresponding to the various system components will be highlighted in the appropriate color to indicate the current test status, as follows:

- **Green:** All recommended tests for these components have been completed and no problems were identified.
- **Red:** Problems were identified in these components during the performance of the test.
- **Yellow:** The tests executed so far on these components have passed, but not all recommended tests have been performed.

6.) At any stage, trackball to the **Pause** button and press **Set**, if required.

7.) To resume testing (from the point where you paused), trackball to the **Start** button and press **Set**.

When the DC Offset Calibration Test sequence is complete:

- the *Diagnostic Test* window displays the Finished message
- the View Test Log window opens automatically, listing the test performed and showing whether it passed or failed, as shown in the example in Figure 7-7 "View Test Log - DC Offset Calibration" on page 7-26.

7-4-2 Calibration Tests (cont'd)

Figure 7-7 View Test Log - DC Offset Calibration

NOTE: There is one test report (ADC Offset values) which is listed in the Reports window on the right. By default, this report is displayed in the Reports window below.

8.) Use the scroll arrows at the bottom of the Reports window (see Figure 7-7 "View Test Log - DC Offset Calibration" on page 7-26) to scroll through the channels and view the corresponding results.

9) When done, trackball to the **Close** button and press **Set** to close the View Report window.

10) After reviewing the test results, proceed as follows:

- If no problems were identified, it is recommended to re-boot the system (this is obligatory when prompted).
- If no problems were identified but the problem persists, contact your local GE HEALTHCARE field engineer for assistance.
- If errors were identified but the results were marginal, perform calibration, as described in "DC Offset Calibration" on page 7-24, and then repeat the test.
- If errors were identified and the results were not marginal, verify that all system cables and boards are connected (not misplaced) and functioning properly, as described in *Chapter 5 - Components and Function (Theory)*.

  If the problem persists, this indicates that either the specific board you tested is faulty or that another board that supports the operation of that board is faulty. Contact your local GE HEALTHCARE field engineer for assistance.

11.) Trackball to the **Exit** button and press **Set** to close the *View Test Log* dialog box.

12.) Press the <**Esc**> button on the keyboard to close the Diagnostic *Test Window*.

7-4-2-2 DC Offset Verification

NOTE: For a description of this test, refer to the information provided in • "DC Offset Verification" on page 7-10.

NOTICE In order to access an individual board test, it is necessary to insert the service dongle from system boot-up and enter the Service Password.

NOTE: When performing this test, no probe should be connected to the system and nothing should be touching the probe connectors!

1.) In the *Diagnostic Test* window, trackball to **CD Offset Verification** in the list of tests available for selection from the Diagnostic Test Tree (see Figure 7-8 "CD Offset Verification Test" on page 7-27) and press **Set**. The CD Offset Verification name is displayed under *Execute;* the relevant system components to be tested are highlighted light blue in the Schematic View (PIB, PSB, TR32 and RFI boards), as shown below:

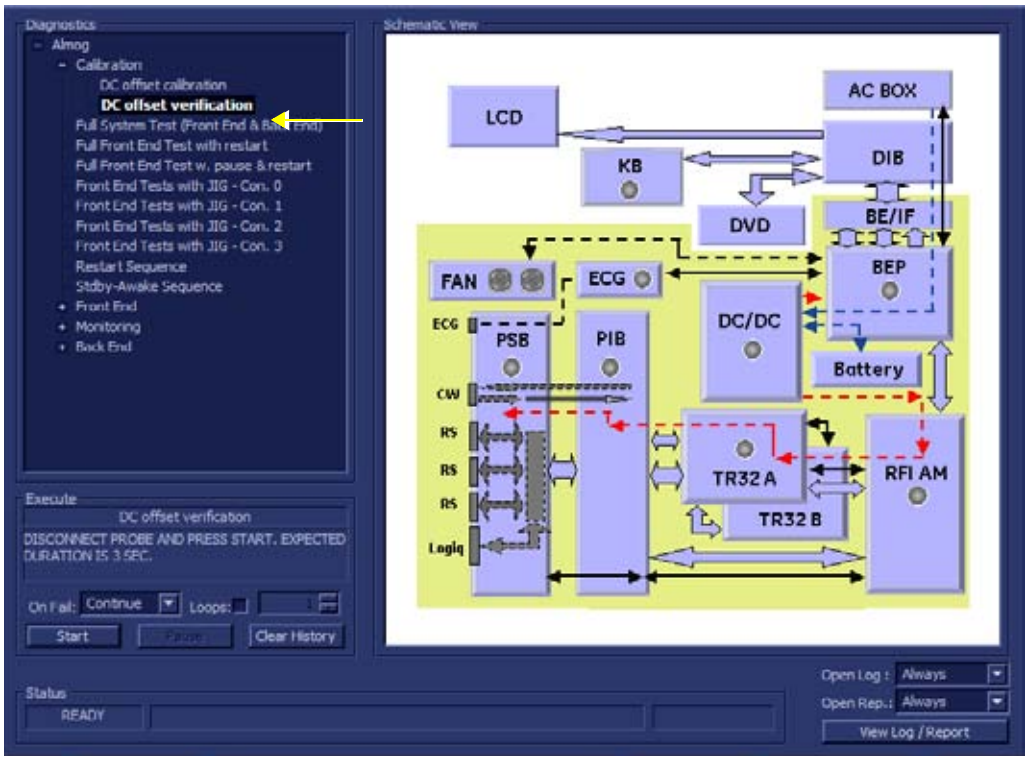


Figure 7-8 CD Offset Verification Test

2.) As indicated in the *Special Instructions* area, disconnect any probes currently connected to the system and make sure that nothing is touching the probe connectors.

3.) Under the *Special Instructions* area, activate the **Loops** checkbox and select the required number of *Loops* from the combo box.

4.) Adjacent to *On Fail,* select either **Stop** or **Continue**, as required. Stopping on failure enables you to review a failed test, the moment it fails. Alternatively, you may prefer testing to continue on failure and later you may review the report.

5.) Trackball to the **Start** button and press **Set**.

7-4-2-2 DC Offset Verification (cont'd)

The CD Offset Verification Test commences. While the test proceeds, the name of the test currently in progress (CD Offset Verification) is displayed in the *Execute* field and the current *Loop #* and specific test are shown below. The messages *Init Done* and *Please Wait* are displayed beside the progress bar in the *Status* area.

As the testing sequence progresses, the progress bar will advance to reflect the test progress. Status indicators in the Data Flow map corresponding to the various system components will be highlighted in the appropriate color to indicate the current test status, as follows:

- **Green:** All recommended tests for these components have been completed and no problems were identified.
- **Red:** Problems were identified in these components during the performance of the test.
- **Yellow:** The tests executed so far on these components have passed, but not all recommended tests have been performed.

6.) At any stage, trackball to the **Pause** button and press **Set**, if required.

7.) To resume testing (from the point where you paused), trackball to the **Start** button and press **Set**.

When the CD Offset Verification Test sequence is complete:

- the *Diagnostic Test* window displays the Finished message
- the View Test Log window opens automatically, listing all tests performed and showing details of which tests passed or failed, as shown in the example in Figure 7-9 "View Test Log - CD Offset Verification Test" on page 7-28.

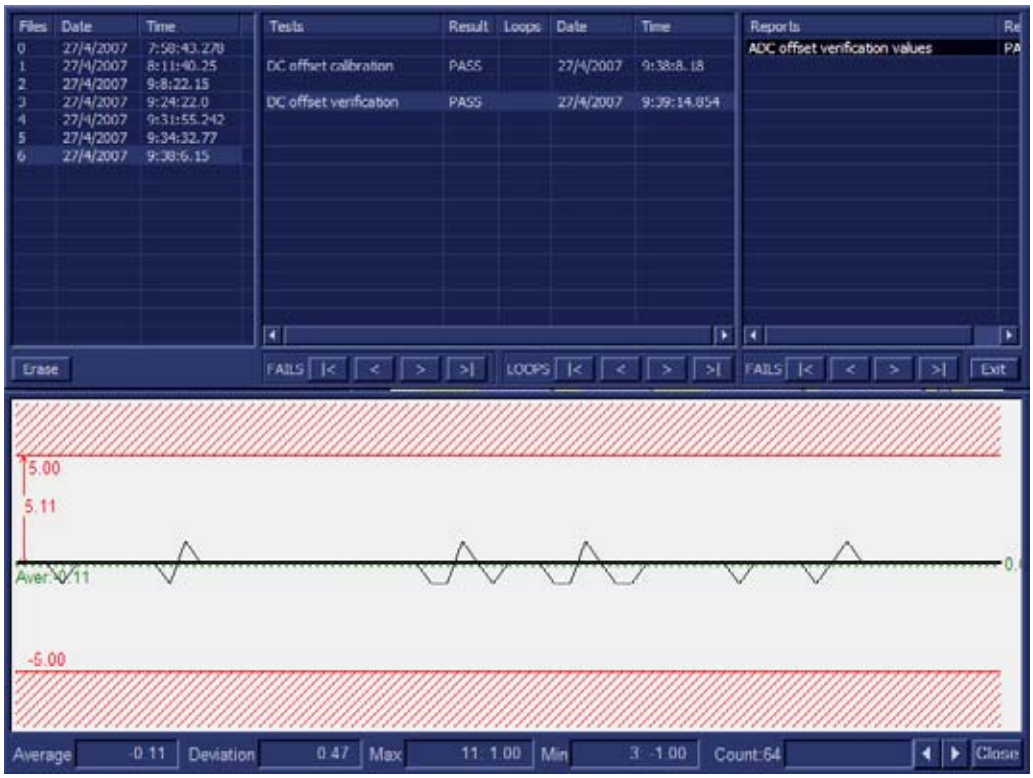


Figure 7-9 View Test Log - CD Offset Verification Test

8.) If necessary, use the scroll bars and/or arrows to scroll through the list of Test results.

7-4-2-2 DC Offset Verification (cont'd)

NOTE: For this test, there is one report (ADC Offset verification values) which is listed in the Reports window on the right. By default, this report is displayed in the Reports window below.

9.) Use the scroll arrows at the bottom of the Reports window (see Figure 7-9 "View Test Log - CD Offset Verification Test" on page 7-28) to scroll through the channels and view the corresponding results.

10) When done, trackball to the **Close** button and press **Set** to close the View Report window.

11) After reviewing the test results, proceed as follows:

- If no problems were identified, it is recommended to re-boot the system (this is obligatory when prompted).
- If no problems were identified but the problem persists, contact your local GE HEALTHCARE field engineer for assistance.
- If errors were identified but the results were marginal, perform calibration, as described in "DC Offset Calibration" on page 7-24, and then repeat the test.
- If errors were identified and the results were not marginal, verify that all system cables and boards are connected (not misplaced) and functioning properly, as described in *Chapter 5 - Components and Function (Theory)*.

  If the problem persists, this indicates that either the specific board you tested is faulty or that another board that supports the operation of this board is faulty. Contact your local GE HEALTHCARE field engineer for assistance.

12.) Trackball to the **Exit** button and press **Set** to close the *View Test Log* dialog box.

13.) Press the <**Esc**> button on the keyboard to close the Diagnostic *Test Window*.

7-4-3 Radio Frequency Interface (RFI) Diagnostic Tests

7-4-3-1 Accessing the RFI Diagnostic Test Options

- Access the *Diagnostic Test* window, as described in the 7-4-1 "Accessing the Front End Diagnostic Options" on page 7-24.

7-4-3-2 Full RFI Test

NOTE: For a description of this test, refer to the information provided in "Full RFI Test" on page 7-10

NOTICE **IMPORTANT** In order to access an individual board test, it is necessary to insert the service dongle from system boot-up and enter the Service Password.

NOTE: When performing this test, no probe should be connected to the system and nothing should be touching the probe connectors!

1.) In the *Diagnostic Test* window, trackball to **Full RFI Test** in the list of *RFI* tests available for selection from the Diagnostic Test Tree (see Figure 7-10 "Full RFI Test" on page 7-30) and press **Set**. The Full RFI Test name is displayed under *Execute;* the relevant system component to be tested is highlighted light blue in the Schematic View (RFI), as shown below:

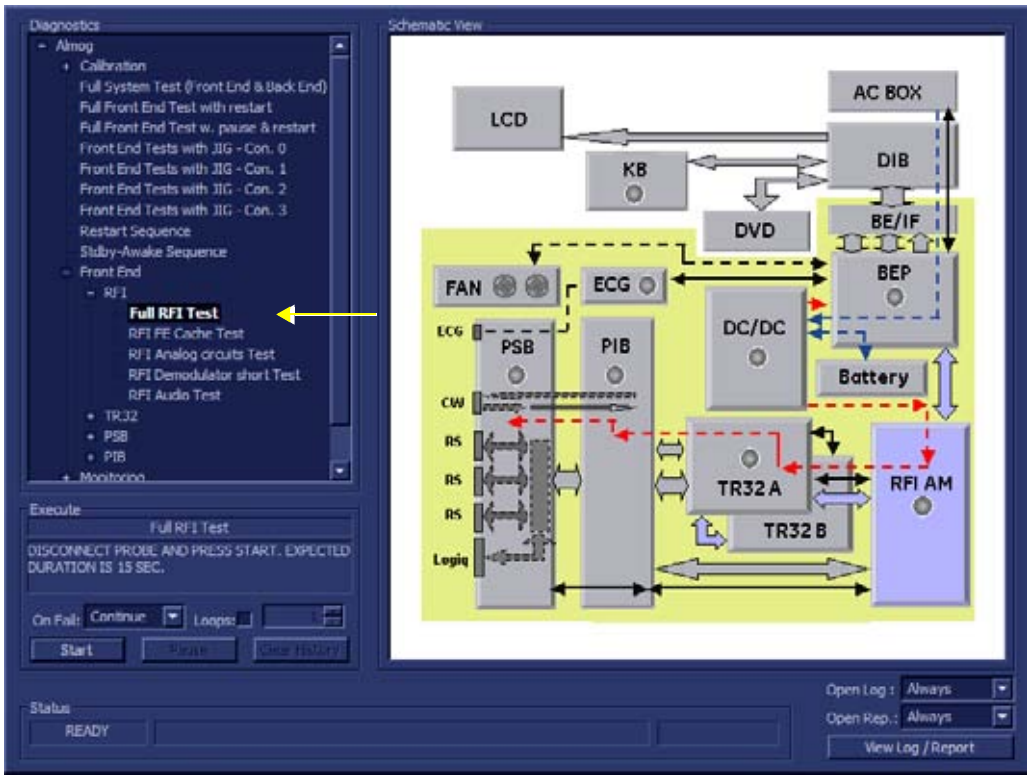


Figure 7-10 Full RFI Test

2.) As indicated in the *Special Instructions* area, disconnect any probes currently connected to the system and make sure that nothing is touching the probe connectors.

3.) Under the *Special Instructions* area, activate the **Loops** checkbox and select the required number of *Loops* from the combo box.

7-4-3-2 Full RFI Test (cont'd)

4.) Adjacent to *On Fail,* select either **Stop** or **Continue**, as required. Stopping on failure enables you to review a failed test, the moment it fails. Alternatively, you may prefer testing to continue on failure and later you may review the report.

5.) Trackball to the **Start** button and press **Set**.

The Full RFI Test commences. While the test proceeds, the name of the test currently in progress (Full RFI Test) is displayed in the *Execute* field and the current *Loop #* and specific test are shown below. The messages *Init Done* and *Please Wait* are displayed beside the progress bar in the *Status* area:

As the testing sequence progresses, the progress bar will advance to reflect the test progress. The LED on the RFI status indicator in the Data Flow map will be highlighted in the appropriate color to indicate the current test status, as follows:

- **Green:** All recommended tests for these components have been completed and no problems were identified.
- **Red:** Problems were identified in these components during the performance of the test.
- **Yellow:** The tests executed so far on these components have passed, but not all recommended tests have been performed.

6.) At any stage, trackball to the **Pause** button and press **Set**, if required.

7.) To resume testing (from the point where you paused), trackball to the **Start** button and press **Set**.

When the Full RFI Test sequence is complete:

- the *Diagnostic Test* window displays the Finished message
- the View Test Log window opens automatically, listing all tests performed and showing details of which tests passed or failed, as shown in the example in the example in Figure 7-11 "View Test Log - Full RFI Test" on page 7-31.

Figure 7-11 View Test Log - Full RFI Test

8.) If necessary, use the scroll bars and/or arrows to scroll through the list of *Test* results.

7-4-3-2 Full RFI Test (cont'd)

NOTE: For the Full RFI test, four tests are performed in the test sequence; these are listed in the Tests window as shown in Figure 7-11. For each currently-selected test (for example, RFI FE Cache Test) the corresponding report is listed in Reports on the right.
For details of each report, refer to the following explanations:

- Figure 7-13 "View Test Log - RFI Cache Test" on page 7-34
- Figure 7-17 "View Test Log - RFI Demodulator Short Test" on page 7-40
- Figure 7-15 "View Test Log - RFI Analog Circuits Test" on page 7-37
- Figure 7-19 "View Test Log - RFI Audio Test" on page 7-43

9) When done, trackball to the **Exit** button and press **Set** to close the View Report window.

10) After reviewing the test results, proceed as follows:

- If no problems were identified, it is recommended to re-boot the system (this is obligatory when prompted).
- If no problems were identified but the problem persists, contact your local GE HEALTHCARE field engineer for assistance.
- If errors were identified but the results were marginal, perform calibration, as described in "DC Offset Calibration" on page 7-24, and then repeat the test.
- If errors were identified and the results were not marginal, verify that all system cables and boards are connected (not misplaced) and functioning properly, as described in *Chapter 5 - Components and Function (Theory)*.

  If the problem persists, this indicates that either the specific board you tested is faulty or that another board that supports the operation of that board is faulty. Contact your local GE HEALTHCARE field engineer for assistance.

11.) Trackball to the **Exit** button and press **Set** to close the *View Test Log* dialog box.

12.) Press the <**Esc**> button on the keyboard to close the Diagnostic *Test Window*.

7-4-3-3 RFI FE Cache Test

NOTE: For a description of this test, refer to the information provided in "RFI FE Cache Test" on page 7-10.

NOTICE **IMPORTANT** In order to access an individual board test, it is necessary to insert the service dongle from system boot-up and enter the Service Password.

NOTE: When performing this test, no probe should be connected to the system and nothing should be touching the probe connectors!

1.) In the *Diagnostic Test* window, trackball to **RFI FE Cache Test** in the list of *RFI* tests available for selection from the Diagnostic Test Tree (see Figure 7-8 "CD Offset Verification Test" on page 7-27) and press **Set**. The RFI FE Cache Test name is displayed under *Execute;* the relevant system component to be tested remain highlighted light blue in the Schematic View (RFI), as shown below:

7-4-3-3 RFI FE Cache Test (cont'd)

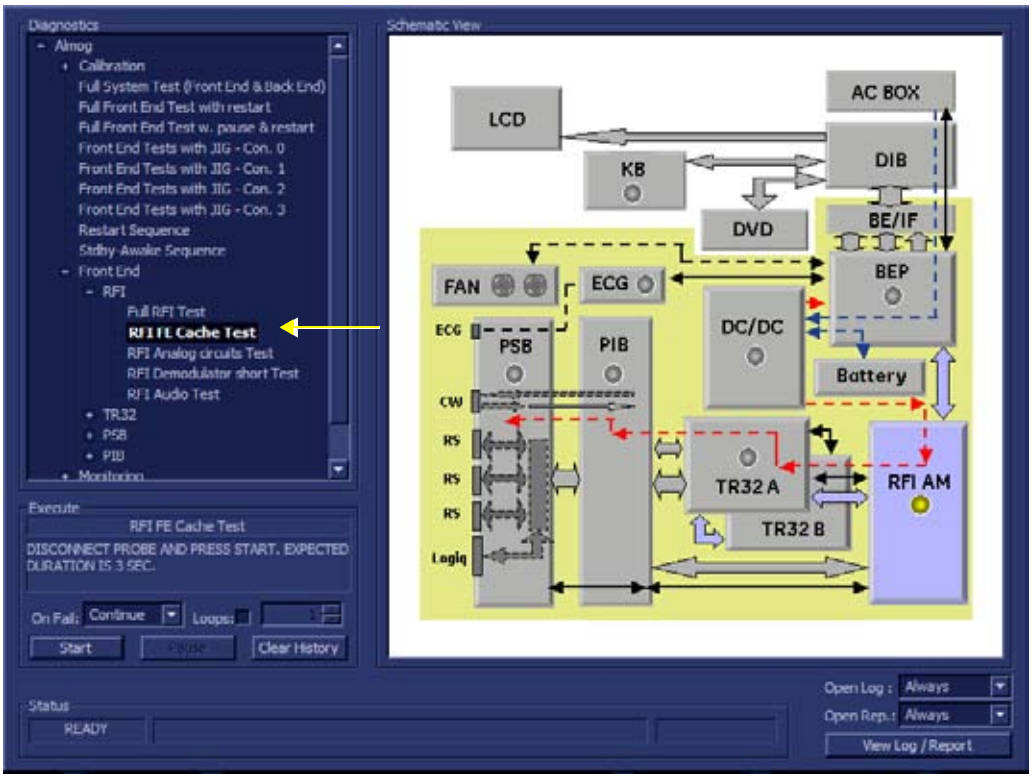


Figure 7-12 RFI FE Cache Test

2.) As indicated in the *Special Instructions* area, disconnect any probes currently connected to the system and make sure that nothing is touching the probe connectors.

3.) Under the *Special Instructions* area, activate the **Loops** checkbox and select the required number of *Loops* from the combo box.

4.) Adjacent to *On Fail,* select either **Stop** or **Continue**, as required. Stopping on failure enables you to review a failed test, the moment it fails. Alternatively, you may prefer testing to continue on failure and later you may review the report.

5.) Trackball to the **Start** button and press **Set**.

The RFI FE Cache Test commences. While the test proceeds, the name of the test currently in progress (RFI FE Cache Test) is displayed in the *Execute* field and the current *Loop #* and specific test are shown below. The messages *Init Done* and *Please Wait* are displayed beside the progress bar in the *Status* area:

As the testing sequence progresses, the progress bar will advance to reflect the test progress. The LED on the RFI status indicator in the Data Flow map will be highlighted in the appropriate color to indicate the current test status, as follows:

- **Green:** All recommended tests for these components have been completed and no problems were identified.
- **Red:** Problems were identified in these components during the performance of the test.
- **Yellow:** The tests executed so far on these components have passed, but not all recommended tests have been performed.

6.) At any stage, trackball to the **Pause** button and press **Set**, if required.

7.) To resume testing (from the point where you paused), trackball to the **Start** button and press **Set**.

7-4-3-3 RFI FE Cache Test (cont'd)

When the RFI FE Cache Test sequence is complete

- the *Diagnostic Test* window displays the Finished message
- the View Test Log window opens automatically, listing all tests performed and showing details of which tests passed or failed, as shown in the example in Figure 7-13 "View Test Log - RFI Cache Test" on page 7-34.

8.) If necessary, use the scroll bars and/or arrows to scroll through the list of Test results.

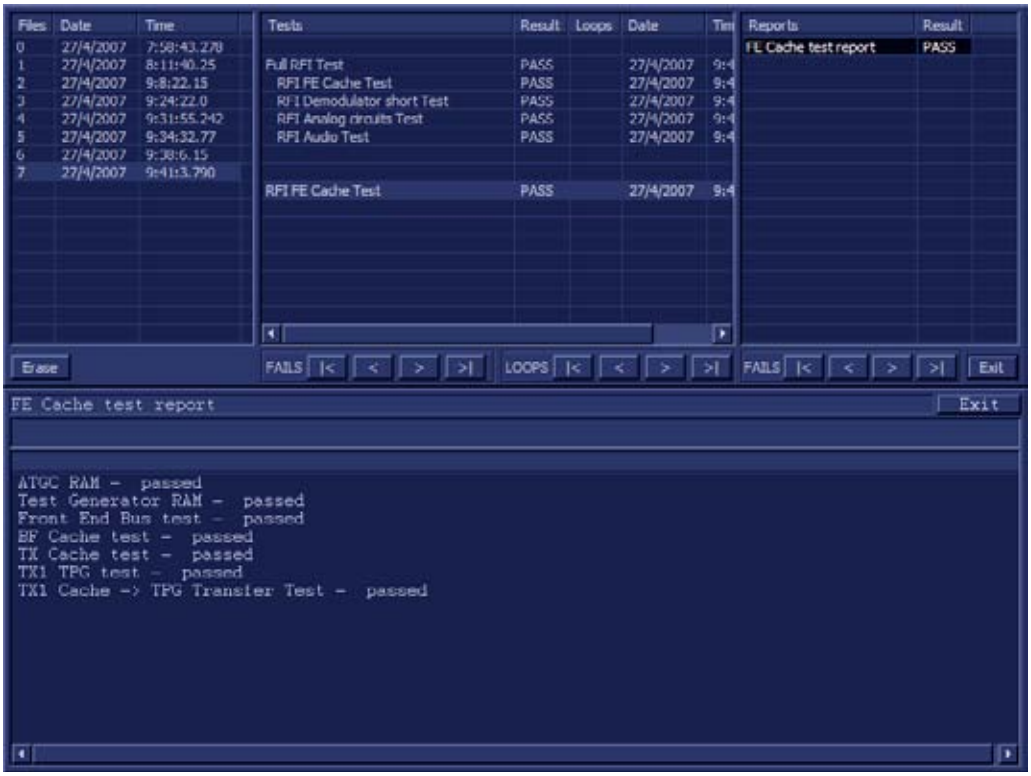


Figure 7-13 View Test Log - RFI Cache Test

NOTE: For this test, there is one report (FE Cache Test report) which is listed in the Reports window on the right. By default, this report is displayed in the Reports window below.

9) When done, trackball to the **Exit** button and press **Set** to close the View Report window.

10) After reviewing the test results, proceed as follows:

- If no problems were identified, it is recommended to re-boot the system (this is obligatory when prompted).
- If no problems were identified but the problem persists, contact your local GE HEALTHCARE field engineer for assistance.
- If errors were identified but the results were marginal, perform calibration, as described in "DC Offset Calibration" on page 7-24, and then repeat the test.
- If "Fail" appears in one of the Result columns, the test has failed, even if "Pass" appears in other columns. Repeat the RFI FE Cache Test.
- If errors were identified and the results were not marginal, verify that all system cables and boards are connected (not misplaced) and functioning properly, as described in *Chapter 5 - Components and Function (Theory)*.

7-4-3-3 RFI FE Cache Test (cont'd)

If the problem persists, this indicates that either the specific board you tested is faulty or that another board that supports the operation of that board is faulty. Contact your local GE HEALTHCARE field engineer for assistance.

11.) Trackball to the **Exit** button and press **Set** to close the *View Test Log* dialog box.

12.) Press the <**Esc**> button on the keyboard to close the Diagnostic *Test Window*.

7-4-3-4 RFI Analog Circuits Test

NOTE: For a description of this test, refer to the information provided in *• "RFI Analog Circuits Test" on page 7-10.*

NOTICE **IMPORTANT** In order to access an individual board test, it is necessary to insert the service dongle from system boot-up and enter the Service Password.

NOTE: When performing this test, no probe should be connected to the system and nothing should be touching the probe connectors!

1.) In the *Diagnostic Test* window, trackball to **RFI Analog Circuits Test** in the list of *RFI* tests available for selection from the Diagnostic Test Tree (see Figure 7-14 "RFI Analog Circuits Test" on page 7-35) and press **Set**. The RFI Analog Circuits Test name is displayed under *Execute;* the relevant system component to be tested are highlighted light blue in the Schematic View (RFI) , as shown below:

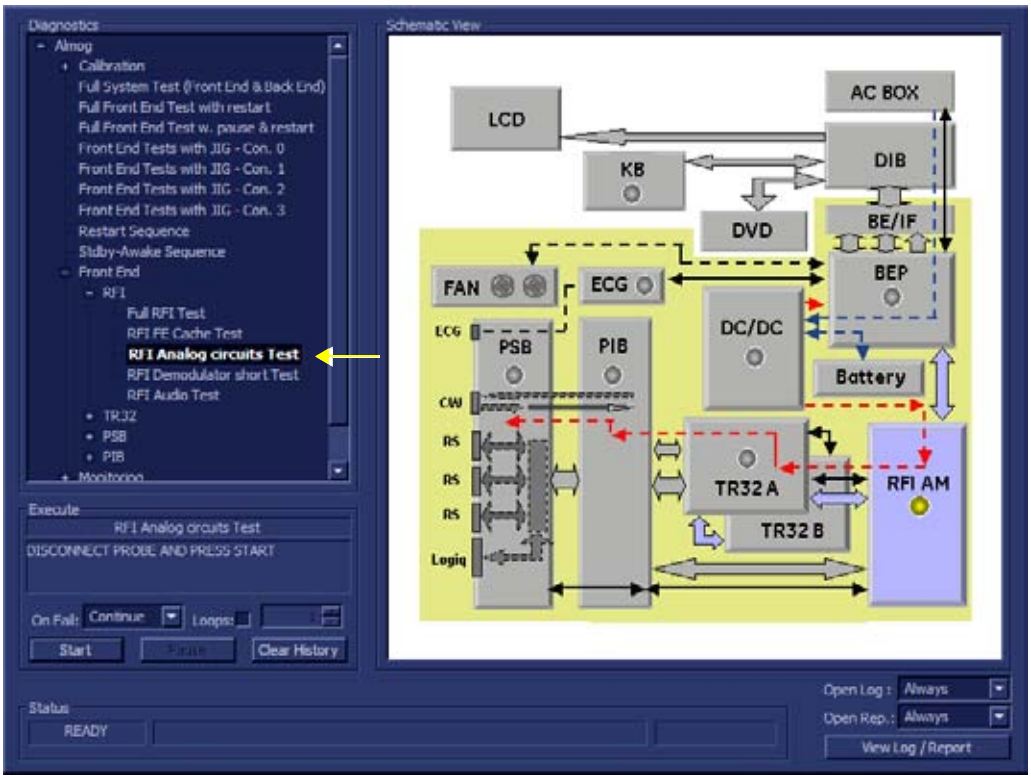


Figure 7-14 RFI Analog Circuits Test

2.) As indicated in the *Special Instructions* area, disconnect any probes currently connected to the system and make sure that nothing is touching the probe connectors.

7-4-3-4 RFI Analog Circuits Test (cont'd)

3.) Under the *Special Instructions* area, activate the **Loops** checkbox and select the required number of *Loops* from the combo box.

4.) Adjacent to *On Fail,* select either **Stop** or **Continue**, as required. Stopping on failure enables you to review a failed test, the moment it fails. Alternatively, you may prefer testing to continue on failure and later you may review the report.

5.) Trackball to the **Start** button and press **Set**.

The RFI Analog Circuits Test commences. While the test proceeds, the name of the test currently in progress is displayed in the *Execute* field and the current *Loop* # and specific test are shown below. The messages *Init Done* and *Please Wait* are displayed beside the progress bar in the *Status* area:

As the testing sequence progresses, the progress bar will advance to reflect the test progress. The LED on the RFI status indicator in the Data Flow map will be highlighted in the appropriate color to indicate the current test status, as follows:

- **Green:** All recommended tests for these components have been completed and no problems were identified.
- **Red:** Problems were identified in these components during the performance of the test.
- **Yellow:** The tests executed so far on these components have passed, but not all recommended tests have been performed.

6.) At any stage, trackball to the **Pause** button and press **Set**, if required.

7.) To resume testing (from the point where you paused), trackball to the **Start** button and press **Set**.

When the RFI Analog Circuits Test sequence is complete,

- the *Diagnostic Test* window displays the Finished message
- the View Test Log window opens automatically, listing all tests performed and showing details of which tests passed or failed, as shown in the example in Figure 7-15 "View Test Log - RFI Analog Circuits Test" on page 7-37

7-4-3-4 RFI Analog Circuits Test (cont'd)

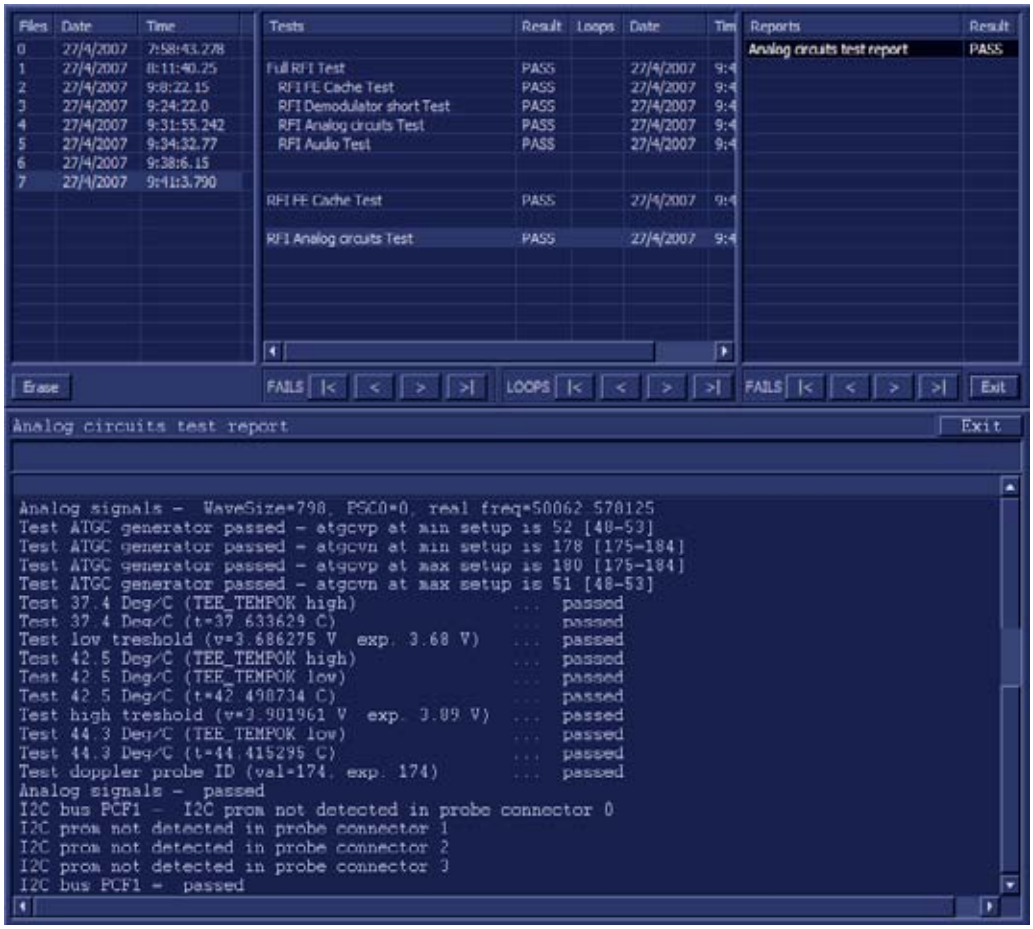

Files
Date
Time
Tests
Result
Loops
Date
Reports
Result
Full RFI Test
RFI FE Cache Test
RFI Demodulator short Test
RFI Analog circuits Test
RFI Audio Test
RFI FE Cache Test
RFI Analog circuits Test
Analog circuits test report
PASS
Erase
FAILS
LOOPS
Exit
Analog circuits test report
Exit
Analog signals - WaveSize=798, PSC0=0, real freq=50062.578125
Test ATGC generator passed - atgcvp at min setup is 52 [48-53]
Test ATGC generator passed - atgcvn at min setup is 178 [175-184]
Test ATGC generator passed - atgcvp at max setup is 180 [175-184]
Test ATGC generator passed - atgcvn at max setup is 51 [48-53]
Test 37.4 Deg/C (TEE_TEMPOK high) ... passed
Test 37.4 Deg/C (t=37.633629 C) ... passed
Test low treshold (v=3.686275 V exp. 3.68 V) ... passed
Test 42.5 Deg/C (TEE_TEMPOK high) ... passed
Test 42.5 Deg/C (TEE_TEMPOK low) ... passed
Test 42.5 Deg/C (t=42.490734 C) ... passed
Test high treshold (v=3.901961 V exp. 3.89 V) ... passed
Test 44.3 Deg/C (TEE_TEMPOK low) ... passed
Test 44.3 Deg/C (t=44.415295 C) ... passed
Test doppler probe ID (val=174, exp. 174) ... passed
Analog signals - passed
I2C bus PCF1 - I2C prom not detected in probe connector 0
I2C prom not detected in probe connector 1
I2C prom not detected in probe connector 2
I2C prom not detected in probe connector 3
I2C bus PCF1 - passed

Figure 7-15 View Test Log - RFI Analog Circuits Test

8.) If necessary, use the scroll bars and/or arrows to scroll through the list of *Test* results.

NOTE: For this test, there is one report (Analog Circuits Test report) which is listed in Reports on the right. By default, this report is displayed in the Reports window below (Figure 7-15 "View Test Log - RFI Analog Circuits Test" on page 7-37). Use the Report window scroll bars and/or arrows to scroll through complete report if necessary.

9) When done, trackball to the **Exit** button and press **Set** to close the View Report window.

10.) After reviewing the test results, proceed as follows:

- If no problems were identified, it is recommended to re-boot the system (this is obligatory when prompted).
- If no problems were identified but the problem persists, contact your local GE HEALTHCARE field engineer for assistance.
- If errors were identified but the results were marginal, perform calibration, as described in "DC Offset Calibration" on page 7-24, and then repeat the test.
- If errors were identified and the results were not marginal, verify that all system cables and boards are connected (not misplaced) and functioning properly, as described in *Chapter 5 - Components and Function (Theory)*.

7-4-3-4 RFI Analog Circuits Test (cont'd)

If the problem persists, this indicates that either the specific board you tested is faulty or that another board that supports the operation of that board is faulty. Contact your local GE HEALTHCARE field engineer for assistance.

11.) Trackball to the **Exit** button and press **Set** to close the *View Test Log* dialog box.

12.) Press the <**Esc**> button on the keyboard to close the Diagnostic *Test Window*.

7-4-3-5 RFI Demodulator Short Test

NOTE: For a description of this test, refer to the information in *• "RFI Demodulator Short Test" on page 7-10*

NOTICE **IMPORTANT** In order to access an individual board test, it is necessary to insert the service dongle from system boot-up and enter the Service Password.

NOTE: When performing this test, no probe should be connected to the system and nothing should be touching the probe connectors!

1.) In the *Diagnostic Test* window, trackball to **RFI Demodulator Short Test** in the list of *RFI* tests available for selection from the Diagnostic Test Tree (see Figure 7-16 "RFI Demodulator Short Test" on page 7-38) and press **Set**. The RFI Demodulator Short Test name is displayed under *Execute;* the relevant system component to be tested are highlighted light blue in the Schematic View (RFI) , as shown below:

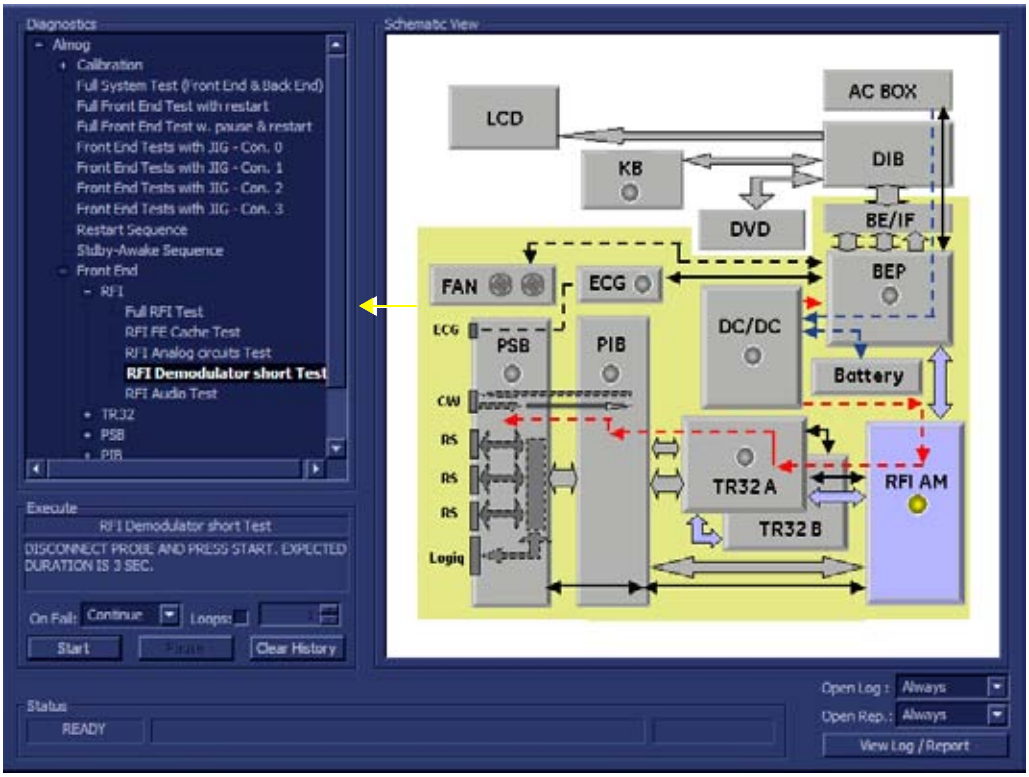


Figure 7-16 RFI Demodulator Short Test

2.) As indicated in the *Special Instructions* area, disconnect any probes currently connected to the system and make sure that nothing is touching the probe connectors.

3.) Under the *Special Instructions* area, activate the **Loops** checkbox and select the required number of *Loops* from the combo box.

7-4-3-5 RFI Demodulator Short Test (cont'd)

4.) Adjacent to *On Fail,* select either **Stop** or **Continue**, as required. Stopping on failure enables you to review a failed test, the moment it fails. Alternatively, you may prefer testing to continue on failure and later you may review the report.

5.) Trackball to the **Start** button and press **Set**.

The RFI Demodulator Short Test commences. While the test proceeds, the name of the test currently in progress is displayed in the *Execute* field and the current *Loop #* and specific test are shown below. The messages *Init Done* and *Please Wait* are displayed beside the progress bar in the *Status* area:

As the testing sequence progresses, the progress bar will advance to reflect the test progress. The LED on the RFI status indicator in the Data Flow map will be highlighted in the appropriate color to indicate the current test status, as follows:

- **Green:** All recommended tests for these components have been completed and no problems were identified.
- **Red:** Problems were identified in these components during the performance of the test.
- **Yellow:** The tests executed so far on these components have passed, but not all recommended tests have been performed.

6.) At any stage, trackball to the **Pause** button and press **Set**, if required.

7.) To resume testing (from the point where you paused), trackball to the **Start** button and press **Set**.

When the RFI Demodulator Short Test sequence is complete:

- the *Diagnostic Test* window displays the Finished message
- the View Test Log window opens automatically, listing all tests performed and showing details of which tests passed or failed, as shown in the example in Figure 7-17 "View Test Log - RFI Demodulator Short Test" on page 7-40.

7-4-3-5 RFI Demodulator Short Test (cont'd)

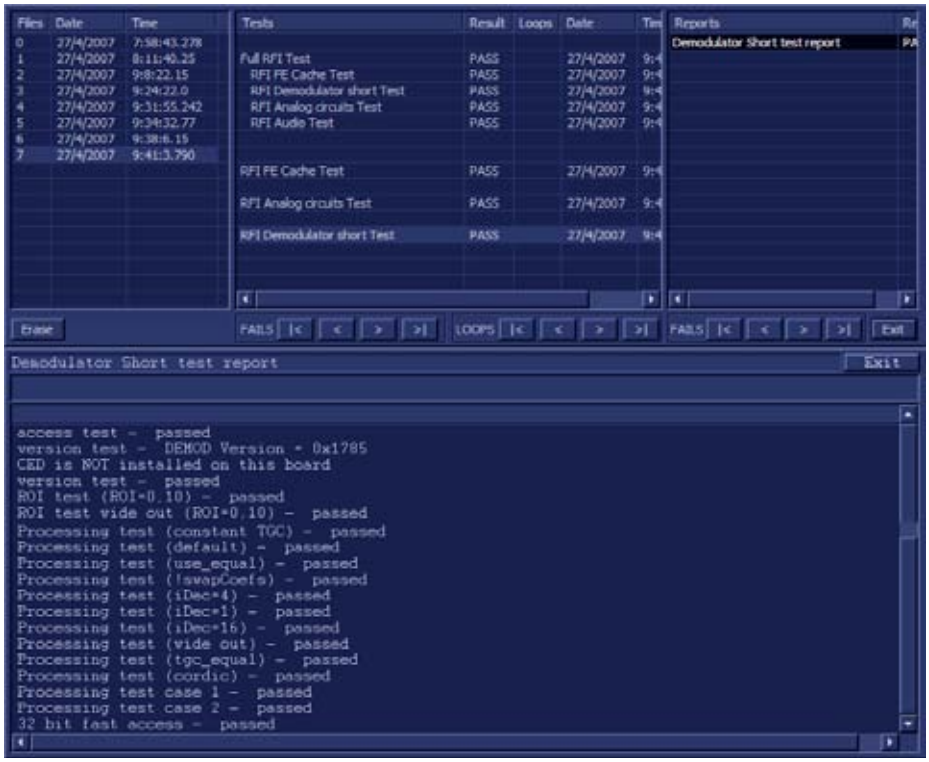


Figure 7-17 View Test Log - RFI Demodulator Short Test

8.) If necessary, use the scroll bars and/or arrows to scroll through the list of *Test* results.

NOTE: For this test, there is one report (Demodulator Short Test report) which is listed in the Reports window on the right. By default, this report is displayed in the Reports window below (Figure 7-17 "View Test Log - RFI Demodulator Short Test" on page 7-40). Use the Report window scroll bars and/or arrows to scroll through complete report if necessary.

9) When done, trackball to the **Exit** button and press **Set** to close the View Report window.

10) After reviewing the test results, proceed as follows:

- If no problems were identified, it is recommended to re-boot the system (this is obligatory when prompted).
  - If no problems were identified but the problem persists, contact your local GE HEALTHCARE field engineer for assistance.
- If errors were identified but the results were marginal, perform calibration, as described in "DC Offset Calibration" on page 7-24, and then repeat the test.
- If errors were identified and the results were not marginal, verify that all system cables and boards are connected (not misplaced) and functioning properly, as described in *Chapter 5 - Components and Function (Theory)*.

  If the problem persists, this indicates that either the specific board you tested is faulty or that another board that supports the operation of that board is faulty. Contact your local GE HEALTHCARE field engineer for assistance.

11.) Trackball to the **Exit** button and press **Set** to close the *View Test Log* dialog box.

12.) Press the <**Esc**> button on the keyboard to close the Diagnostic *Test Window*.

7-4-3-6 RFI Audio Test

NOTE: For a description of this test, refer to the information provided in • "RFI Audio Test" on page 7-10.

NOTICE **IMPORTANT** In order to access an individual board test, it is necessary to insert the service dongle from system boot-up and enter the Service Password.

NOTE: When performing this test, no probe should be connected to the system and nothing should be touching the probe connectors!

1.) In the *Diagnostic Test* window, trackball to **RFI Audio Test** in the list of *RFI* tests available for selection from the Diagnostic Test Tree (see Figure 7-8 "CD Offset Verification Test" on page 7-27) and press **Set**. The RFI Audio Test name is displayed under *Execute;* the relevant system component to be tested is highlighted light blue in the Schematic View (RFI) , as shown below:

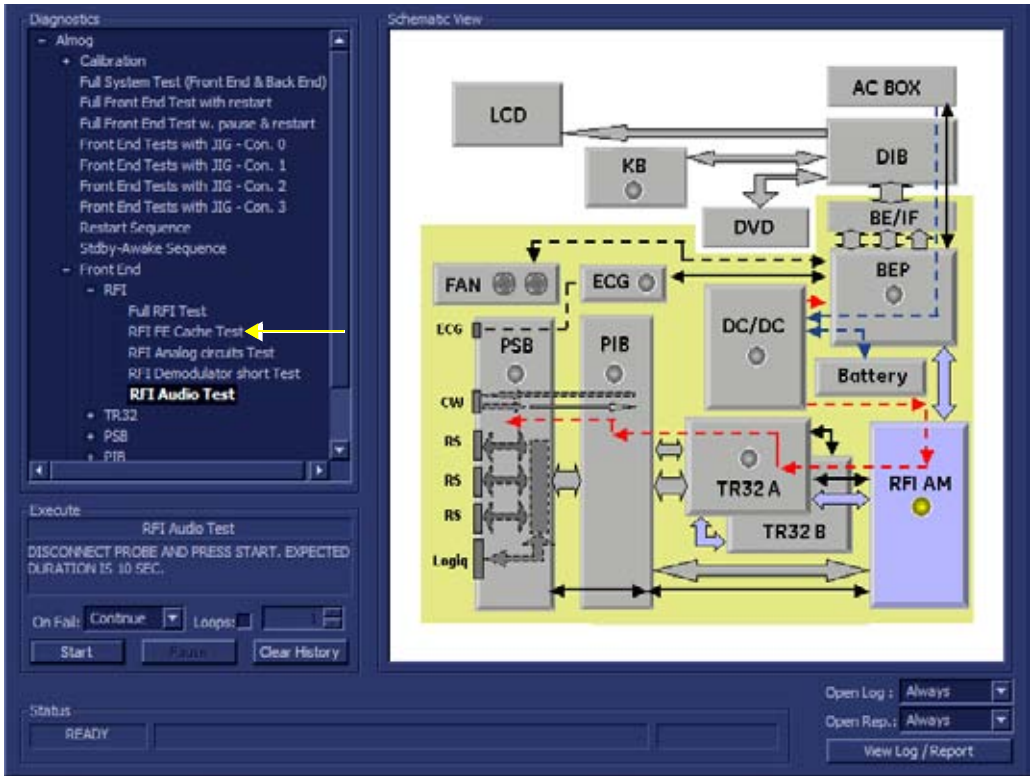


Figure 7-18 RFI Audio Test

2.) As indicated in the *Special Instructions* area, disconnect any probes currently connected to the system and make sure that nothing is touching the probe connectors.

3.) Under the *Special Instructions* area, activate the **Loops** checkbox and select the required number of *Loops* from the combo box.

4.) Adjacent to *On Fail,* select either **Stop** or **Continue**, as required. Stopping on failure enables you to review a failed test, the moment it fails. Alternatively, you may prefer testing to continue on failure and later you may review the report.

5.) Trackball to the **Start** button and press **Set**.

7-4-3-6 RFI Audio Test (cont'd)

The RFI Audio Test commences. While the test proceeds, the name of the test currently in progress is displayed in the *Execute* field and the current *Loop #* and specific test are shown below. The messages *Init Done* and *Please Wait* are displayed beside the progress bar in the *Status* area:

As the testing sequence progresses, the progress bar will advance to reflect the test progress. The LED on the RFI status indicator in the Data Flow map will be highlighted in the appropriate color to indicate the current test status, as follows:

- **Green:** All recommended tests for these components have been completed and no problems were identified.
- **Red:** Problems were identified in these components during the performance of the test.
- **Yellow:** The tests executed so far on these components have passed, but not all recommended tests have been performed.

When the *upper* progress bar reaches approximately midway in the *Status* area, a loud, high-pitched sound will be heard coming from the speakers.

6.) At any stage, trackball to the **Pause** button and press **Set**, if required.

7.) To resume testing (from the point where you paused), trackball to the **Start** button and press **Set**.

When the RFI Audio Test sequence is complete:

- the *Diagnostic Test* window displays the Finished message
- the View Test Log window opens automatically, listing all tests performed and showing details of which tests passed or failed, as shown in the example in Figure 7-19 "View Test Log - RFI Audio Test" on page 7-43.

7-4-3-6 RFI Audio Test (cont'd)

Figure 7-19 View Test Log - RFI Audio Test

NOTE: For this test, this one report (Demodulator Short Test report) which is listed in the Reports window on the right. By default, this report is displayed in the Reports window below, as shown in the example in Figure 7-19 "View Test Log - RFI Audio Test" on page 7-43.

8) When done, trackball to the **Exit** button and press **Set** to close the View Report window.

9) After reviewing the test results, proceed as follows:

- If no problems were identified, it is recommended to re-boot the system (this is obligatory when prompted).
- If no problems were identified but the problem persists, contact your local GE HEALTHCARE field engineer for assistance.
- If errors were identified but the results were marginal, perform calibration, as described in "DC Offset Calibration" on page 7-24, and then repeat the test.
- If errors were identified and the results were not marginal, verify that all system cables and boards are connected (not misplaced) and functioning properly, as described in *Chapter 5 - Components and Function (Theory)*.

  If the problem persists, this indicates that either the specific board you tested is faulty or that another board that supports the operation of that board is faulty. Contact your local GE HEALTHCARE field engineer for assistance.

7-4-4 TR 32 Diagnostic Tests

NOTE: The TR32 Diagnostic Tests are used to perform functional testing of both the TR32A and TR32 boards.

7-4-4-1 Accessing the TR32 Diagnostic Test Options

- Access the *Diagnostic Test* window, as described in the 7-4-1 "Accessing the Front End Diagnostic Options" on page 7-24.

7-4-4-2 Beamformer Tests

7-4-4-2-1 TR32 BF Digital Test

NOTE: For a description of this test, refer to the information in - "TR32 BF Digital Test" on page 7-11.

NOTICE In order to access an individual board test, it is necessary to insert the service dongle from system boot-up and enter the Service Password.

NOTE: When performing this test, no probe should be connected to the system and nothing should be touching the probe connectors!

1.) In the *Diagnostic Test* window, trackball to **TR32 BF Digital Test** in the list of *TR32, BF* tests available for selection from the Diagnostic Test Tree (see Figure 7-20 below) and press **Set**. The TR32 BF Digital Test name is displayed under *Execute;* the relevant system components to be tested are highlighted light blue in the Schematic View (TR32A and TR32B), as shown below:

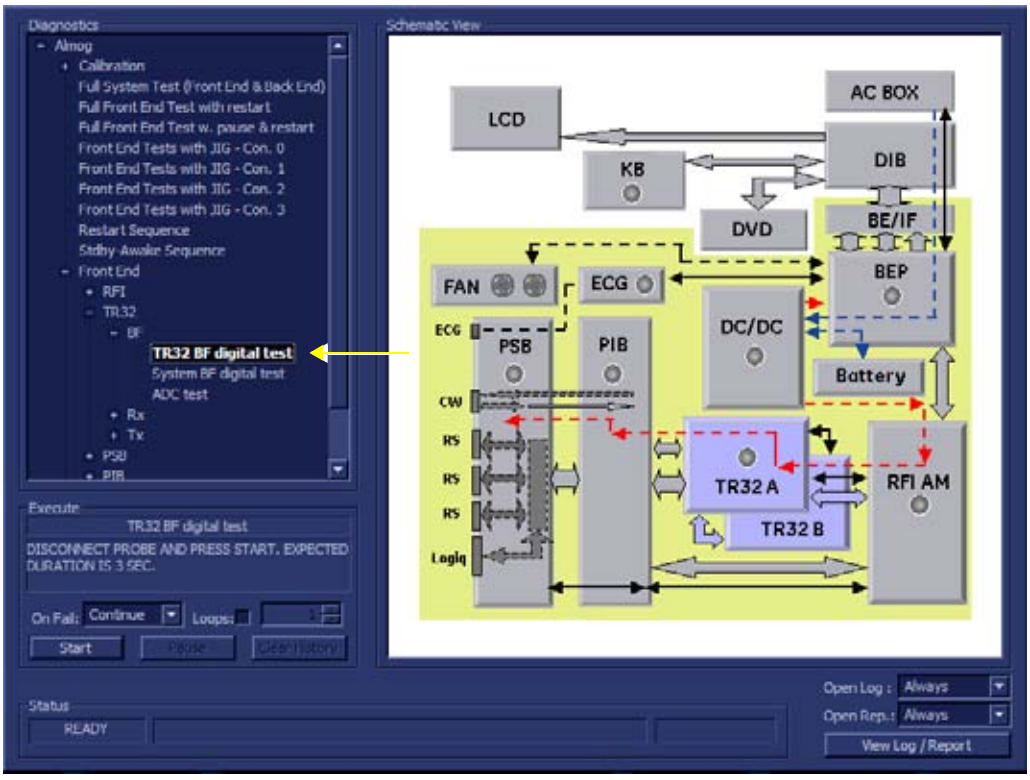


Figure 7-20 TR32 BF Digital Test

2.) As indicated in the *Special Instructions* area, disconnect any probes currently connected to the system and make sure that nothing is touching the probe connectors.

7-4-4 TR 32 Diagnostic Tests (cont'd)

3.) Under the *Special Instructions* area, activate the **Loops** checkbox and select the required number of *Loops* from the combo box.

4.) Adjacent to *On Fail,* select either **Stop** or **Continue**, as required. Stopping on failure enables you to review a failed test, the moment it fails. Alternatively, you may prefer testing to continue on failure and later you may review the report.

5.) Trackball to the **Start** button and press **Set**.

The TR32 BF Digital Test **c**ommences. While the test proceeds, the name of the test currently in progress is displayed in the *Execute* field and the current *Loop #* and specific test are shown below. The messages *Init Done* and *Please Wait* are displayed beside the progress bar in the *Status* area:

As the testing sequence progresses, the progress bar will advance to reflect the test progress. Status indicators in the Data Flow map corresponding to the various system components will be highlighted in the appropriate color to indicate the current test status, as follows:

- **Green:** All recommended tests for these components have been completed and no problems were identified.
- **Red:** Problems were identified in these components during the performance of the test.
- **Yellow:** The tests executed so far on these components have passed, but not all recommended tests have been performed.

6.) At any stage, trackball to the **Pause** button and press **Set**, if required.

7.) To resume testing (from the point where you paused), trackball to the **Start** button and press **Set**.

When the TR32 BF Digital Test sequence is complete:

- the *Diagnostic Test* window displays the Finished message
- the View Test Log window opens automatically, listing all tests performed and showing details of which tests passed or failed, as shown in the example in Figure 7-21 "View Test Log - TR32 BF Digital Test (MLA0)" on page 7-45.

Figure 7-21 View Test Log - TR32 BF Digital Test (MLA0)

8.) If necessary, use the scroll bars and/or arrows to scroll through the list of *Test* results.

7-4-4 TR 32 Diagnostic Tests (cont'd)

NOTE: For this test, there are two reports (MLA0 and MLA1) which is listed in Reports on the right. By default, the MLA0 report is displayed in the Reports window below, showing the results for both the TR32A and TR32B boards (Figure 7-21 "View Test Log - TR32 BF Digital Test (MLA0)" on page 7-45).

9.) To view the MLA1 test results in the Report window, select MLA1 test results under Reports.

The MLA1 report is displayed in the Reports window below:

Figure 7-22 View Test Log - TR32 BF Digital Test (MLA1)

10) When done, trackball to the **Exit** button and press **Set** to close the View Report window.

11) After reviewing the test results, proceed as follows:

- If no problems were identified, it is recommended to re-boot the system (this is obligatory when prompted).
- If no problems were identified but the problem persists, contact your local GE HEALTHCARE field engineer for assistance.
- If errors were identified but the results were marginal, perform calibration, as described in "DC Offset Calibration" on page 7-24, and then repeat the test.
- If errors were identified and the results were not marginal, verify that all system cables and boards are connected (not misplaced) and functioning properly, as described in *Chapter 5 - Components and Function (Theory)*.

  If the problem persists, this indicates that either the specific board you tested is faulty or that another board that supports the operation of that board is faulty. Contact your local GE HEALTHCARE field engineer for assistance.

12.) Trackball to the **Exit** button and press **Set** to close the *View Test Log* dialog box.

13.) Press the <**Esc**> button on the keyboard to close the Diagnostic *Test Window*.

7-4-4 TR 32 Diagnostic Tests (cont'd)

7-4-4-2-2 System BF Digital Test

NOTE: For a description of this test, refer to the information in "System BF Digital Test" on page 7-11.

NOTICE **IMPORTANT** In order to access an individual board test, it is necessary to insert the service dongle from system boot-up and enter the Service Password.

NOTE: When performing this test, no probe should be connected to the system and nothing should be touching the probe connectors!

1.) In the *Diagnostic Test* window, trackball to **System BF Digital Test** in the list of *TR32, BF* tests available for selection from the Diagnostic Test Tree (see Figure 7-8 "CD Offset Verification Test" on page 7-27) and press **Set**. The System BF Digital Test name is displayed under *Execute;* the relevant system components to be tested are highlighted light blue in the Schematic View (TR32A. TR32B) , as shown below:

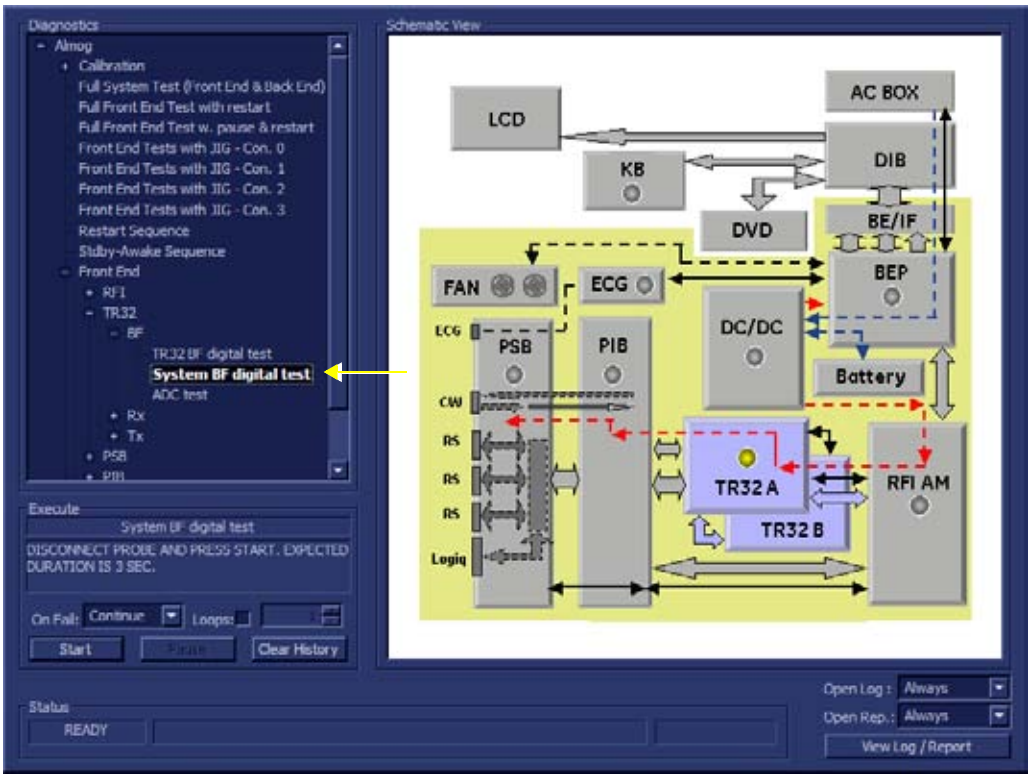


Figure 7-23 System BF Digital Test

2.) As indicated in the *Special Instructions* area, disconnect any probes currently connected to the system and make sure that nothing is touching the probe connectors.

3.) Under the *Special Instructions* area, activate the **Loops** checkbox and select the required number of *Loops* from the combo box.

4.) Adjacent to *On Fail,* select either **Stop** or **Continue**, as required. Stopping on failure enables you to review a failed test, the moment it fails. Alternatively, you may prefer testing to continue on failure and later you may review the report.

5.) Trackball to the **Start** button and press **Set**.

7-4-4 TR 32 Diagnostic Tests (cont'd)

The System BF Digital Test commences. While the test proceeds, the name of the test currently in progress (System BF Digital Test) is displayed in the *Execute* field and the current *Loop #* and specific test are shown below. The messages *Init Done* and *Please Wait* are displayed beside the progress bar in the *Status* area.

As the testing sequence progresses, the progress bar will advance to reflect the test progress. Status indicators in the Data Flow map corresponding to the various system components will be highlighted in the appropriate color to indicate the current test status, as follows:

- **Green:** All recommended tests for these components have been completed and no problems were identified.
- **Red:** Problems were identified in these components during the performance of the test.
- **Yellow:** The tests executed so far on these components have passed, but not all recommended tests have been performed.

6.) At any stage, trackball to the **Pause** button and press **Set**, if required.

7.) To resume testing (from the point where you paused), trackball to the **Start** button and press **Set**.

When the System BF Digital Test sequence is complete:

- the *Diagnostic Test* window displays the Finished message
- the View Test Log window opens automatically, listing all tests performed and showing details of which tests passed or failed, as shown in the example in Figure 7-24 "View Test Log - System BF Digital Test (MLA0)" on page 7-48.

Figure 7-24 View Test Log - System BF Digital Test (MLA0)

8.) If necessary, use the scroll bars and/or arrows to scroll through the list of *Test* results.

NOTE: For this test, there are two reports (MLA0 and MLA1) which is listed in Reports on the right. By default, the MLA0 report is displayed in the Reports window below (Figure 7-24 "View Test Log - System BF Digital Test (MLA0)" on page 7-48).

9.) To view the MLA1 test results, select MLA1 test results under *Reports*.

The MLA1 test results are displayed in the Report Window, as shown below.

7-4-4 TR 32 Diagnostic Tests (cont'd)

Figure 7-25 View Test Log - System BF Digital Test (MLA1)

10) When done, trackball to the **Exit** button and press **Set** to close the View Report window.

11) After reviewing the test results, proceed as follows:

- If no problems were identified, it is recommended to re-boot the system (this is obligatory when prompted).
- If no problems were identified but the problem persists, contact your local GE HEALTHCARE field engineer for assistance.
- If errors were identified but the results were marginal, perform calibration, as described in "DC Offset Calibration" on page 7-24, and then repeat the test.
- If errors were identified and the results were not marginal, verify that all system cables and boards are connected (not misplaced) and functioning properly, as described in *Chapter 5 - Components and Function (Theory)*.

  If the problem persists, this indicates that either the specific board you tested is faulty or that another board that supports the operation of that board is faulty. Contact your local GE HEALTHCARE field engineer for assistance.

12.) Trackball to the **Exit** button and press **Set** to close the *View Test Log* dialog box.

13.) Press the <**Esc**> button on the keyboard to close the Diagnostic *Test Window*.

7-4-4 TR 32 Diagnostic Tests (cont'd)

7-4-4-2-3 ADC Test

NOTE: For a description of this test, refer to the information in - "ADC Test" on page 7-11.

NOTICE **IMPORTANT** In order to access an individual board test, it is necessary to insert the service dongle from system boot-up and enter the Service Password.

NOTE: When performing this test, no probe should be connected to the system and nothing should be touching the probe connectors!

1.) In the *Diagnostic Test* window, trackball to **ADC Test** in the list of *TR32, BF* tests available for selection from the Diagnostic Test Tree (see Figure 7-8 "CD Offset Verification Test" on page 7-27) and press **Set**. The ADC Test name is displayed under *Execute;* the relevant system components to be tested are highlighted light blue in the Schematic View (TR32A. TR32B), as shown below:

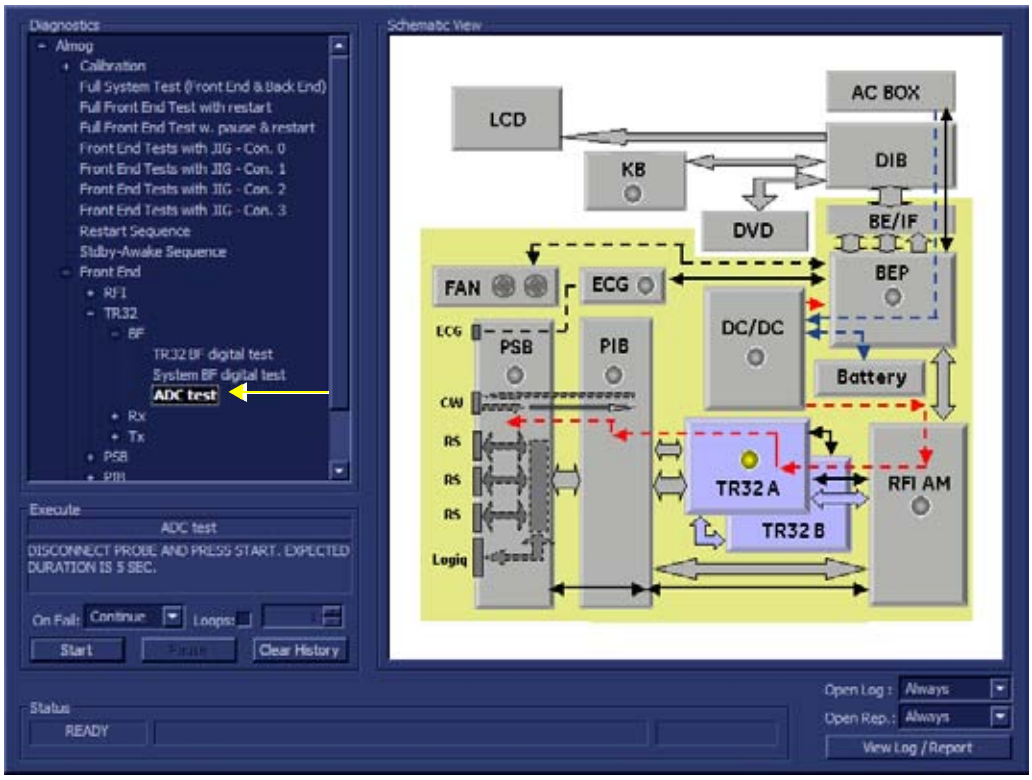


Figure 7-26 ADC Test

2.) As indicated in the *Special Instructions* area, disconnect any probes currently connected to the system and make sure that nothing is touching the probe connectors.

3.) Under the *Special Instructions* area, activate the **Loops** checkbox and select the required number of *Loops* from the combo box.

4.) Adjacent to *On Fail,* select either **Stop** or **Continue**, as required. Stopping on failure enables you to review a failed test, the moment it fails. Alternatively, you may prefer testing to continue on failure and later you may review the report.

5.) Trackball to the **Start** button and press **Set**.

7-4-4 TR 32 Diagnostic Tests (cont'd)

The ADC Test commences. While the test proceeds, the name of the test currently in progress (ADC Test) is displayed in the *Execute* field and the current *Loop #* and specific test are shown below. The messages *Init Done* and *Please Wait* are displayed beside the progress bar in the *Status* area.

As the testing sequence progresses, the progress bar will advance to reflect the test progress. Status indicators in the Data Flow map corresponding to the various system components will be highlighted in the appropriate color to indicate the current test status, as follows:

- **Green:** All recommended tests for these components have been completed and no problems were identified.
- **Red:** Problems were identified in these components during the performance of the test.
- **Yellow:** The tests executed so far on these components have passed, but not all recommended tests have been performed.

6.) At any stage, trackball to the **Pause** button and press **Set**, if required.

7.) To resume testing (from the point where you paused), trackball to the **Start** button and press **Set**.

When the ADC Test sequence is complete:

- the *Diagnostic Test* window displays the Finished message
- the View Test Log window opens automatically, listing all tests performed and showing details of which tests passed or failed, as shown in the example in Figure 7-27 "View Test Log - First Harmonic Report" on page 7-51.

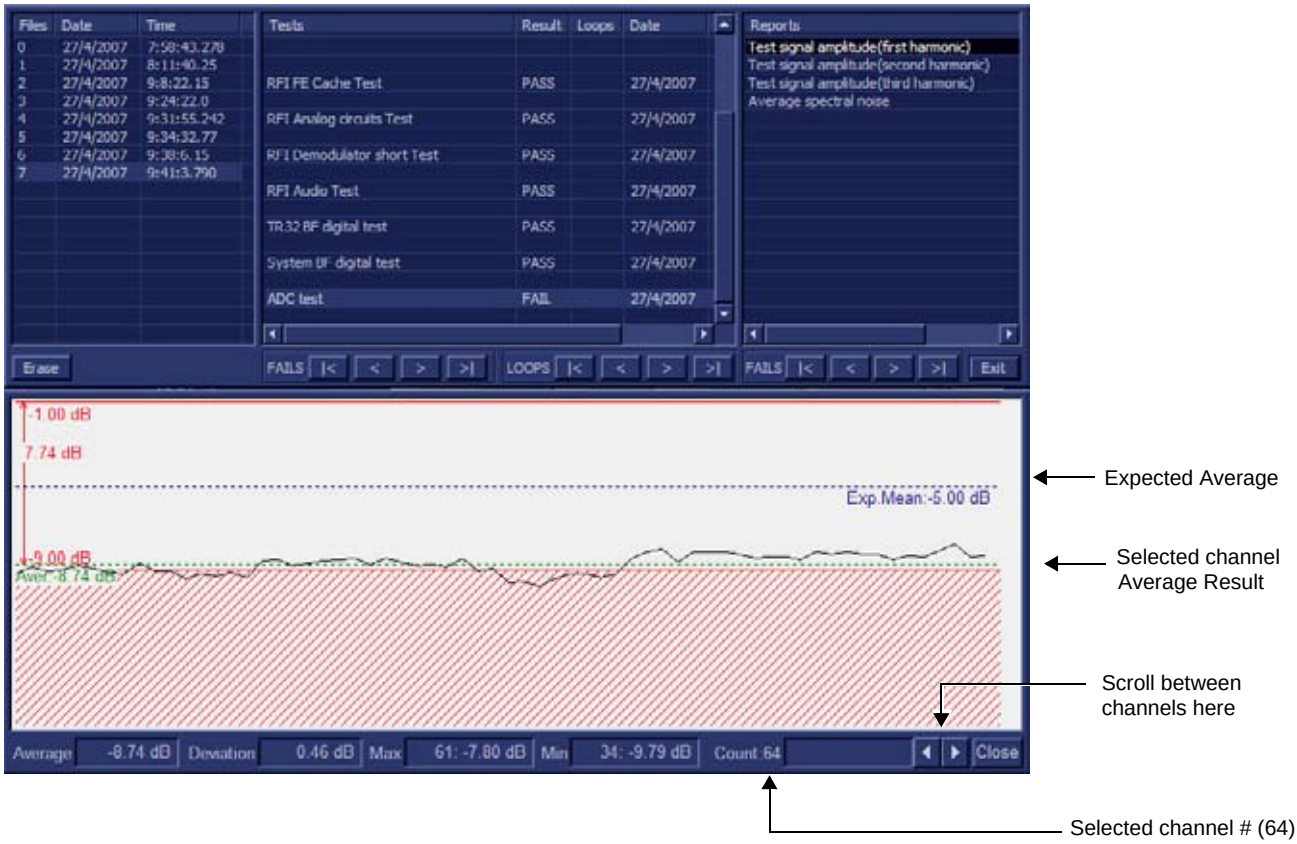


Figure 7-27 View Test Log - First Harmonic Report

7-4-4 TR 32 Diagnostic Tests (cont'd)

NOTE: The ADC test has four test reports which are listed in Reports on the right. By default, the First Harmonic report is displayed in the Reports window below (Figure 7-27 "View Test Log - First Harmonic Report" on page 7-51).

NOTE: Left and right arrows provided in the View Report window enable scrolling between the different channels. Left-clicking on a currently-selected channel marks a red square on the report graph, and also evokes the display of the following information relative to that specific point: Average, Deviation (standard deviation from the Average), Max, and Min.
The signal should be within the limits marked in the white area (the dotted line represents the Average), as shown in Figure 7-27 "View Test Log - First Harmonic Report" on page 7-51.

8) When done, trackball to the **Close** button and press **Set** to close the View Report window.

9.) Select the second report (the report is highlighted in the *Reports* list, and the corresponding results are shown in the Report window below, as shown in Figure 7-28 "View Test Log - Second Harmonic" on page 7-52).

Figure 7-28 View Test Log - Second Harmonic

10.) Use the tools provided to scroll through the channels and view the results, as previously described.

11) When done, trackball to the **Close** button and press **Set** to close the View Report window.

12.) Select the third report (the report is highlighted in the *Reports* list, and the corresponding results are shown in the Report window below, as shown in Figure 7-29 "View Test Log - Third Harmonic" on page 7-53).

7-4-4 TR 32 Diagnostic Tests (cont'd)

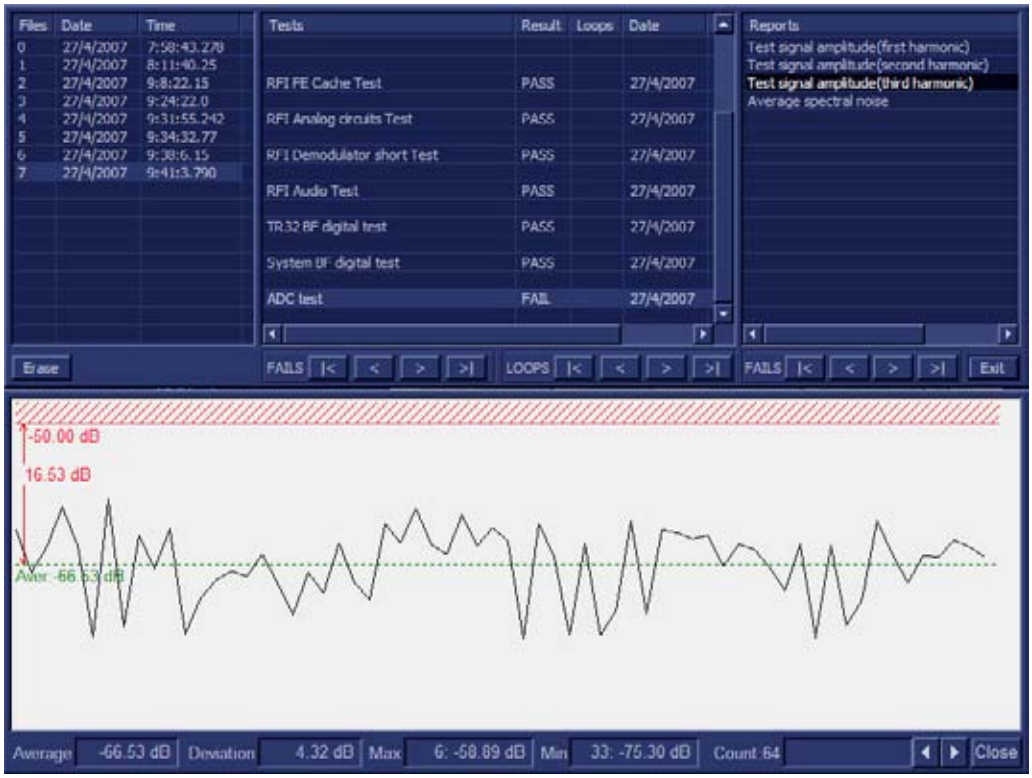


Figure 7-29 View Test Log - Third Harmonic

13.) Use the tools provided to scroll through the channels and view the results, as previously described.

14) When done, trackball to the **Close** button and press **Set** to close the View Report window.

15.) Select the fourth report (the report is highlighted in the *Reports* list, and the corresponding results are shown in the Report window below, as shown in Figure 7-30 "View Test Log - Average" on page 7-54).

7-4-4 TR 32 Diagnostic Tests (cont'd)

Figure 7-30 View Test Log - Average

16.) Use the tools provided to scroll through the channels and view the results, as previously described.

17) When done, trackball to the **Close** button and press **Set** to close the View Report window.

18) After reviewing the test results, proceed as follows:

- If no problems were identified, it is recommended to re-boot the system (this is obligatory when prompted).
- If no problems were identified but the problem persists, contact your local GE HEALTHCARE field engineer for assistance.
- If errors were identified but the results were marginal, perform calibration, as described in "DC Offset Calibration" on page 7-24, and then repeat the test.
- If errors were identified and the results were not marginal, verify that all system cables and boards are connected (not misplaced) and functioning properly, as described in *Chapter 5 - Components and Function (Theory)*.

  If the problem persists, this indicates that either the specific board you tested is faulty or that another board that supports the operation of that board is faulty. Contact your local GE HEALTHCARE field engineer for assistance.

19.) Trackball to the **Exit** button and press **Set** to close the *View Test Log* dialog box.

20.) Press the <**Esc**> button on the keyboard to close the Diagnostic *Test Window*.

7-4-4 TR 32 Diagnostic Tests (cont'd)

7-4-4-3 Receive (RX) Tests

7-4-4-3-1 RX Test

NOTE: For a description of this test, refer to the information in "RX Test" on page 7-11.

NOTICE **IMPORTANT** In order to access an individual board test, it is necessary to insert the service dongle from system boot-up and enter the Service Password.

NOTE: When performing this test, no probe should be connected to the system and nothing should be touching the probe connectors!

1.) In the *Diagnostic Test* window, trackball to **Rx Test** in the list of *RX* tests available for selection from the Diagnostic Test Tree (see Figure 7-31 "Rx Test" on page 7-55) and press **Set**. The RX Test name is displayed under *Execute;* the relevant system components to be tested are highlighted light blue in the Schematic View (TR32A. TR32B), as shown below:

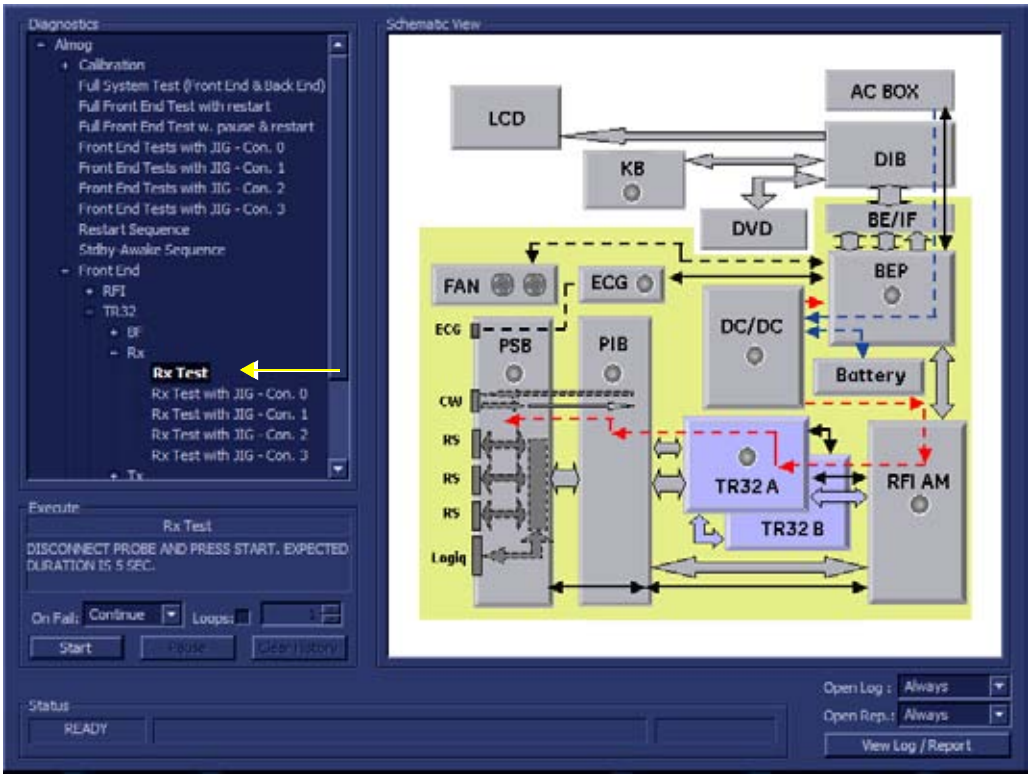


Figure 7-31 Rx Test

2.) As indicated in the *Special Instructions* area, disconnect any probes currently connected to the system and make sure that nothing is touching the probe connectors.

3.) Under the *Special Instructions* area, activate the **Loops** checkbox and select the required number of *Loops* from the combo box.

4.) Adjacent to *On Fail,* select either **Stop** or **Continue**, as required. Stopping on failure enables you to review a failed test, the moment it fails. Alternatively, you may prefer testing to continue on failure and later you may review the report.

7-4-4 TR 32 Diagnostic Tests (cont'd)

5.) Trackball to the **Start** button and press **Set**.

The Rx Test commences. While the test proceeds, the name of the test currently in progress (Rx Test) is displayed in the *Execute* field and the current *Loop #* and specific test are shown below. The messages *Init Done* and *Please Wait* are displayed beside the progress bar in the *Status* area.

As the testing sequence progresses, the progress bar will advance to reflect the test progress. Status indicators in the Data Flow map corresponding to the various system components will be highlighted in the appropriate color to indicate the current test status, as follows:

- **Green:** All recommended tests for these components have been completed and no problems were identified.
- **Red:** Problems were identified in these components during the performance of the test.
- **Yellow:** The tests executed so far on these components have passed, but not all recommended tests have been performed.

6.) At any stage, trackball to the **Pause** button and press **Set**, if required.

7.) To resume testing (from the point where you paused), trackball to the **Start** button and press **Set**.

When the Rx Test sequence is complete:

- the *Diagnostic Test* window displays the Finished message
- the View Test Log window opens automatically, listing all tests performed and showing details of which tests passed or failed, as shown in the example in Figure 7-32 "View Test Log - Rx Test Signal Amplitude" on page 7-56.

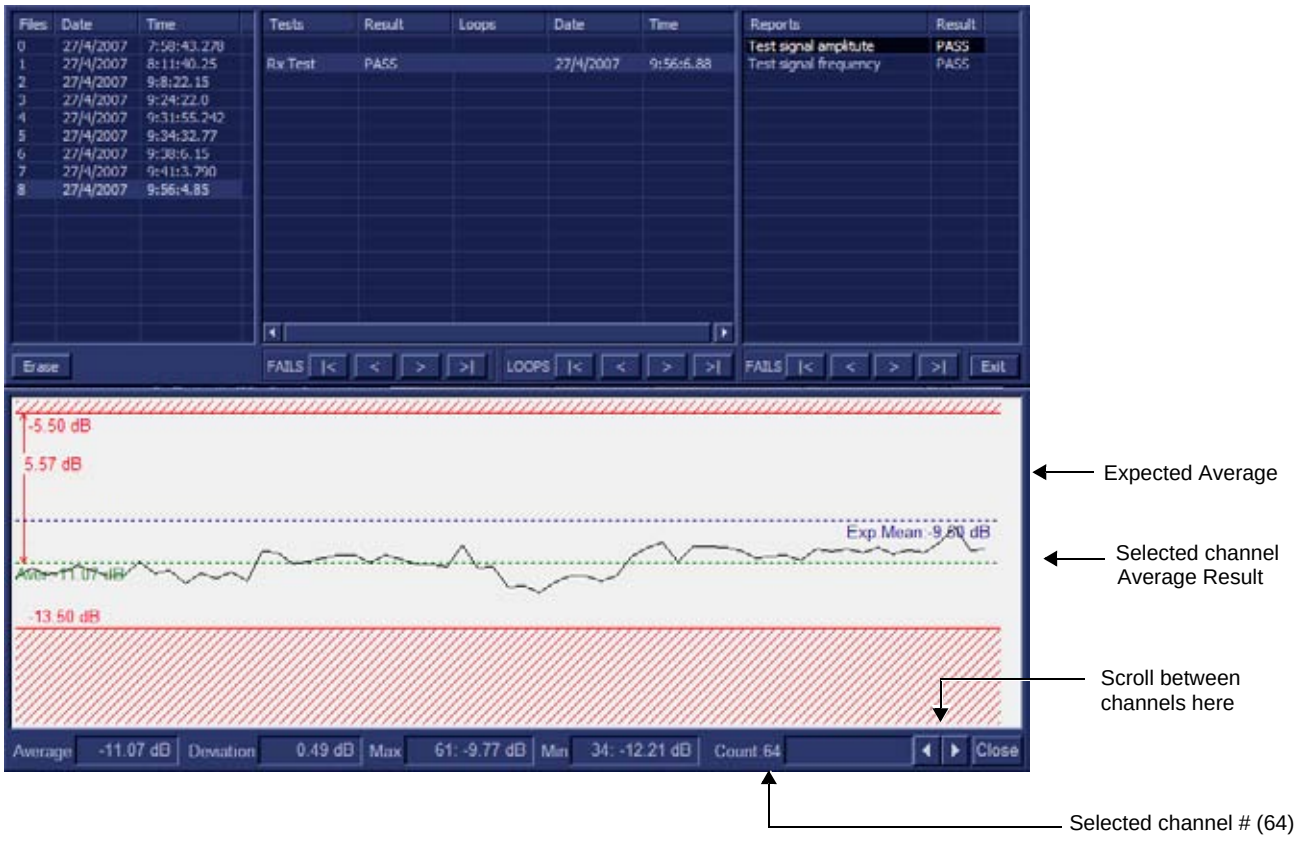


Figure 7-32 View Test Log - Rx Test Signal Amplitude

7-4-4 TR 32 Diagnostic Tests (cont'd)

NOTE: The Rx test has two test reports (Test Signal Amplitude and Frequency) which are listed in the Reports window on the right. By default, the Test Signal Amplitude report is displayed in the Reports window below (Figure 7-32 "View Test Log - Rx Test Signal Amplitude" on page 7-56).

NOTE: Left and right arrows provided in the View Report window enable scrolling between the different channels.
Left-clicking on a currently-selected channel marks a red square on the report graph, and also evokes the display of the following information relative to that specific point: Average, Deviation (standard deviation from the Average), Max, and Min.
The signal should be within the limits marked in the white area (the dotted line represents the Average), as shown in Figure 7-32 "View Test Log - Rx Test Signal Amplitude" on page 7-56.

8) When done, trackball to the **Close** button and press **Set** to close the View Report window.

9) Select the second report (*Frequency*); the report is highlighted in the *Reports* list, and the corresponding results are shown in the Report window below, as shown in Figure 7-28 "View Test Log - Second Harmonic" on page 7-52.

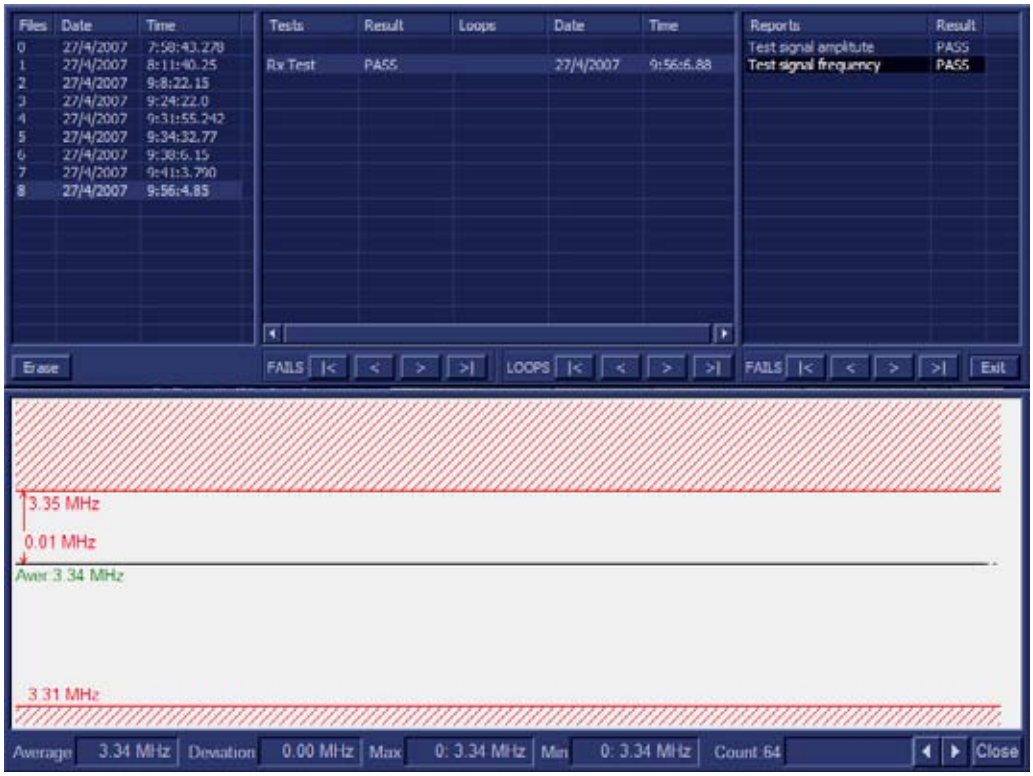


Figure 7-33 View Test Log - Rx Test Signal Frequency

10.) Use the tools provided to scroll through the channels and view the results, as previously described.

11) When done, trackball to the **Close** button and press **Set** to close the View Report window.

12) After reviewing the test results, proceed as follows:

- If no problems were identified, it is recommended to re-boot the system (this is obligatory when prompted).
- If no problems were identified but the problem persists, contact your local GE HEALTHCARE field engineer for assistance.

7-4-4 TR 32 Diagnostic Tests (cont'd)

- If errors were identified but the results were marginal, perform calibration, as described in "DC Offset Calibration" on page 7-24, and then repeat the test.
- If errors were identified and the results were not marginal, verify that all system cables and boards are connected (not misplaced) and functioning properly, as described in *Chapter 5 - Components and Function (Theory)*.

  If the problem persists, this indicates that either the specific board you tested is faulty or that another board that supports the operation of that board is faulty. Contact your local GE HEALTHCARE field engineer for assistance.

13.) Trackball to the **Exit** button and press **Set** to close the *View Test Log* dialog box.

14.) Press the <**Esc**> button on the keyboard to close the Diagnostic *Test Window*.

7-4-5 Probe Interface Board Diagnostic Tests

7-4-5-1 Accessing the Probe Interface Board Diagnostic Test Options

- Access the *Diagnostic Test* window, as described in the 7-4-1 "Accessing the Front End Diagnostic Options" on page 7-24.

7-4-6 Probe Select Board Diagnostic Tests

7-4-6-1 Accessing the Probe Select Board Diagnostic Test Options

- Access the *Diagnostic Test* window, as described in the 7-4-1 "Accessing the Front End Diagnostic Options" on page 7-24.

7-4-6-2 ACW Test

7-4-6-2-1 ACW IQ Symmetry Test

NOTE: For a description of this test, refer to the information in - "ACW IQ Symmetry Test" on page 7-12.

NOTICE **IMPORTANT** In order to access an individual board test, it is necessary to insert the service dongle from system boot-up and enter the Service Password.

NOTE: When performing this test, no probe should be connected to the system and nothing should be touching the probe connectors!

It is necessary to *disable* the Loop option where it should not be used.
After performing this test, you must re-boot the system and perform the DC Offset Calibration procedure as described in "DC Offset Calibration" on page 7-24.

1.) In the *Diagnostic Test* window, trackball to **ACW IQ Symmetry Test** in the list of *ACW* tests available for selection from the Diagnostic Test Tree (see Figure 7-31 "Rx Test" on page 7-55) and press **Set**. The ACW IQ Symmetry Test name is displayed under *Execute;* the relevant system components to be tested are highlighted light blue in the Schematic View (PIB & PSB), as shown below:

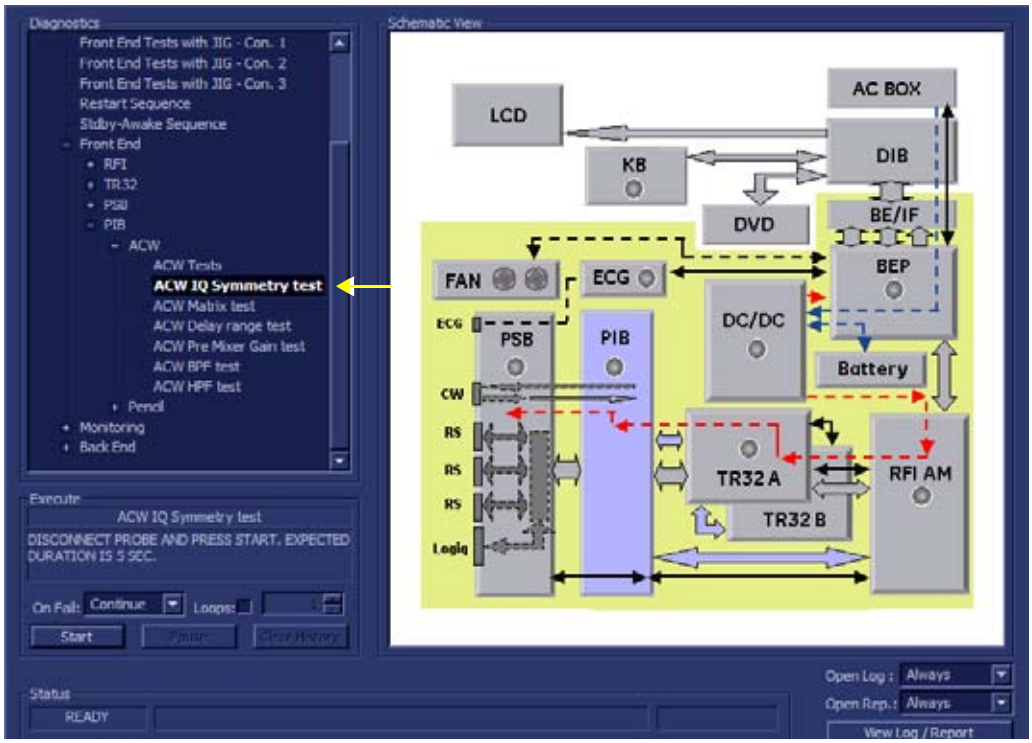


Figure 7-34 ACW IQ Symmetry Test

7-4-6 Probe Select Board Diagnostic Tests (cont'd)

2.) As indicated in the *Special Instructions* area, disconnect any probes currently connected to the system and make sure that nothing is touching the probe connectors.

3.) Adjacent to *On Fail,* select either **Stop** or **Continue**, as required. Stopping on failure enables you to review a failed test, the moment it fails. Alternatively, you may prefer testing to continue on failure and later you may review the report.

4.) Trackball to the **Start** button and press **Set**.

The ACW IQ Symmetry Test commences. While the test proceeds, the name of the test currently in progress (ACW IQ Symmetry Test) is displayed in the *Execute* field and the current *Loop #* and specific test are shown below. The messages *Init Done* and *Please Wait* are displayed beside the progress bar in the *Status* area.

As the testing sequence progresses, the progress bar will advance to reflect the test progress. Status indicators in the Data Flow map corresponding to the various system components will be highlighted in the appropriate color to indicate the current test status, as follows:

- **Green:** All recommended tests for these components have been completed and no problems were identified.
- **Red:** Problems were identified in these components during the performance of the test.
- **Yellow:** The tests executed so far on these components have passed, but not all recommended tests have been performed.

5.) At any stage, trackball to the **Pause** button and press **Set**, if required.

6.) To resume testing (from the point where you paused), trackball to the **Start** button and press **Set**.

When the ACW IQ Symmetry Test sequence is complete:

- the *Diagnostic Test* window displays the Finished message
- the View Test Log window opens automatically, listing all tests performed and showing details of which tests passed or failed, as shown in the example in Figure 7-35 "View Test Log - ACW IQ Symmetry Test" on page 7-62.

7-4-6 Probe Select Board Diagnostic Tests (cont'd)

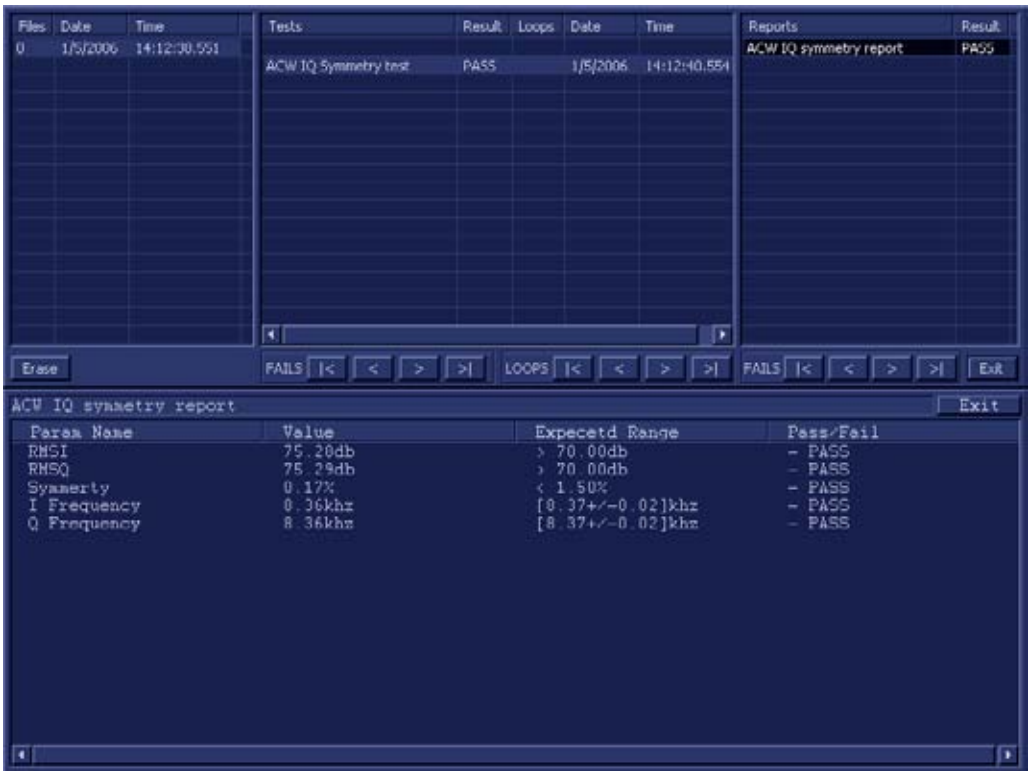


Figure 7-35 View Test Log - ACW IQ Symmetry Test

NOTE: The ACW IQ Symmetry Test test has one test report. By default, this is displayed in the Reports window below (Figure 7-35 "View Test Log - ACW IQ Symmetry Test" on page 7-62).

7) When done, trackball to the **Exit** button and press **Set** to close the View Report window.

8) After reviewing the test results, proceed as follows:

- Re-boot the system (this is obligatory).
- Perform calibration, as described in "DC Offset Calibration" on page 7-24.
- If no problems were identified but the problem persists, contact your local GE HEALTHCARE field engineer for assistance.
- If errors were identified and the results were not marginal, verify that all system cables and boards are connected (not misplaced) and functioning properly, as described in *Chapter 5 - Components and Function (Theory)*.

  If the problem persists, this indicates that either the specific board you tested is faulty or that another board that supports the operation of that board is faulty. Contact your local GE HEALTHCARE field engineer for assistance.

9.) Trackball to the **Exit** button and press **Set** to close the *View Test Log* dialog box.

10.) Press the <**Esc**> button on the keyboard to close the Diagnostic *Test Window*.

7-4-6 Probe Select Board Diagnostic Tests (cont'd)

7-4-6-2-2 ACW Matrix Test

NOTE: For a description of this test, refer to the information in - "ACW Matrix Test" on page 7-12.

NOTICE **IMPORTANT** In order to access an individual board test, it is necessary to insert the service dongle from system boot-up and enter the Service Password.

NOTE: When performing this test, no probe should be connected to the system and nothing should be touching the probe connectors!

It is necessary to *disable* the Loop option where it should not be used.
After performing this test, you must re-boot the system and perform the DC Offset Calibration procedure as described in "DC Offset Calibration" on page 7-24.

1.) In the *Diagnostic Test* window, trackball to **ACW Matrix Test** in the list of *ACW* tests available for selection from the Diagnostic Test Tree (see Figure 7-36 "ACW Matrix Test" on page 7-63) and press **Set**. The ACW Matrix Test name is displayed under *Execute;* the relevant system components to be tested are highlighted light blue in the Schematic View (PIB & PSB), as shown below:

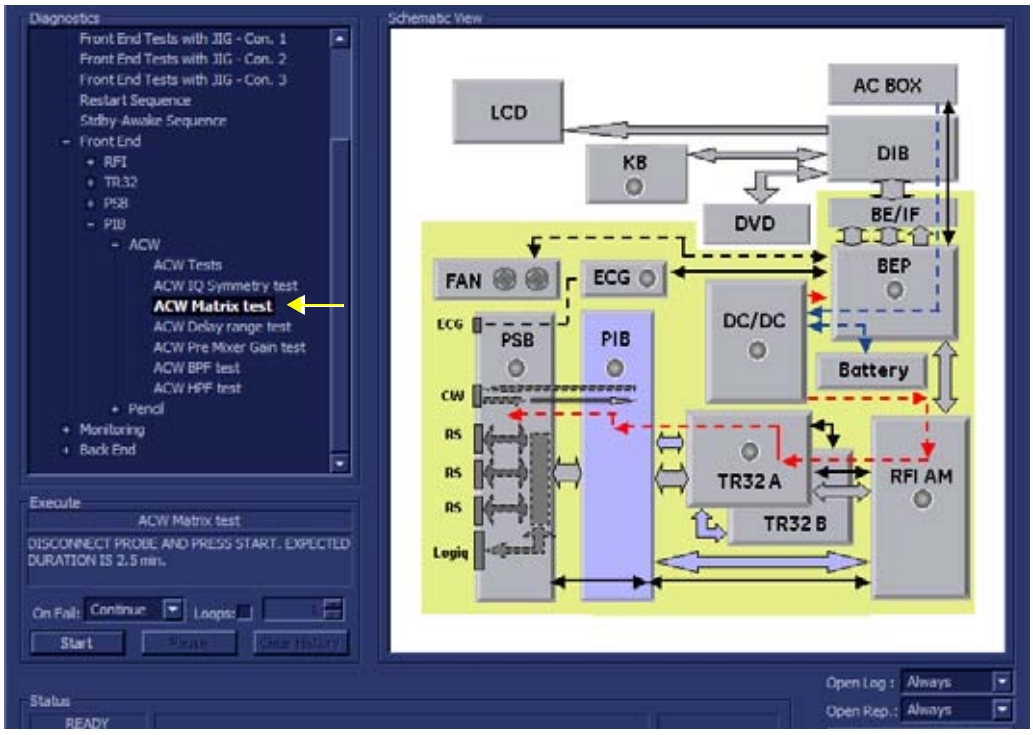


Figure 7-36 ACW Matrix Test

2.) As indicated in the *Special Instructions* area, disconnect any probes currently connected to the system and make sure that nothing is touching the probe connectors.

3.) Adjacent to *On Fail,* select either **Stop** or **Continue**, as required. Stopping on failure enables you to review a failed test, the moment it fails. Alternatively, you may prefer testing to continue on failure and later you may review the report.

4.) Trackball to the **Start** button and press **Set**.

7-4-6 Probe Select Board Diagnostic Tests (cont'd)

The ACW Matrix Test commences. While the test proceeds, the name of the test currently in progress (ACW IQ Symmetry Test) is displayed in the *Execute* field and the current *Loop #* and specific test are shown below. The messages *Init Done* and *Please Wait* are displayed beside the progress bar in the *Status* area.

As the testing sequence progresses, the progress bar will advance to reflect the test progress. Status indicators in the Data Flow map corresponding to the various system components will be highlighted in the appropriate color to indicate the current test status, as follows:

- **Green:** All recommended tests for these components have been completed and no problems were identified.
- **Red:** Problems were identified in these components during the performance of the test.
- **Yellow:** The tests executed so far on these components have passed, but not all recommended tests have been performed.

5.) At any stage, trackball to the **Pause** button and press **Set**, if required.

6.) To resume testing (from the point where you paused), trackball to the **Start** button and press **Set**.

When the ACW Matrix Test sequence is complete:

- the *Diagnostic Test* window displays the Finished message
- the View Test Log window opens automatically, listing all tests performed and showing details of which tests passed or failed, as shown in the example in Figure 7-37 "View Test Log - ACW Matrix Test - Signal Frequency" on page 7-64.

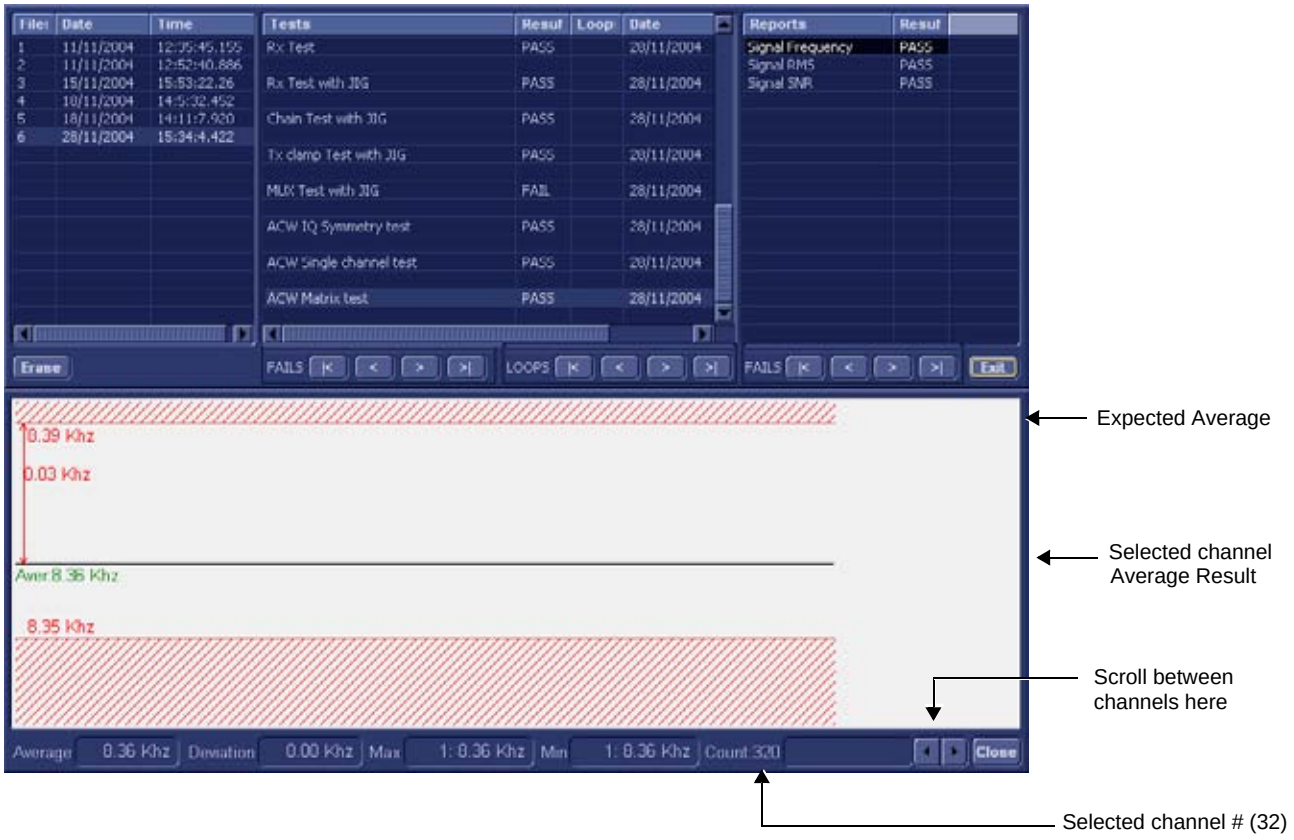


Figure 7-37 View Test Log - ACW Matrix Test - Signal Frequency

7-4-6 Probe Select Board Diagnostic Tests (cont'd)

NOTE: The ACW Matrix Test test has three test reports (Signal Frequency, Signal RMS, and Signal SNR) which are listed in the Reports window on the right. By default, the Signal Frequency report is displayed in the Reports window below (Figure 7-37 "View Test Log - ACW Matrix Test - Signal Frequency" on page 7-64).

NOTE: Left and right arrows provided in the View Report window enable scrolling between the different channels.
Left-clicking on a currently-selected channel marks a red square on the report graph, and also evokes the display of the following information relative to that specific point: Average, Deviation (standard deviation from the Average), Max, and Min.
The signal should be within the limits marked in the white area (the dotted line represents the Average), as shown in Figure 7-37 "View Test Log - ACW Matrix Test - Signal Frequency" on page 7-64.

If the test fails, check the results manually in accordance with Signal SNR limits shown in Table 7-4:

Table 7-4 ACW Matrix Test - Signal SNR Limits

Signal SNR	
Lower Limit dB	**Upper Limit dB**
43.0	55.0

7) When done, trackball to the **Close** button and press **Set** to close the View Report window.

7-4-6 Probe Select Board Diagnostic Tests (cont'd)

8) Select the second report (*Signal RMS*); the report is highlighted in the *Reports* list, and the corresponding results are shown in the Report window below, as shown in Figure 7-38 "View Test Log - ACW Matrix Test - Signal RMS" on page 7-66.

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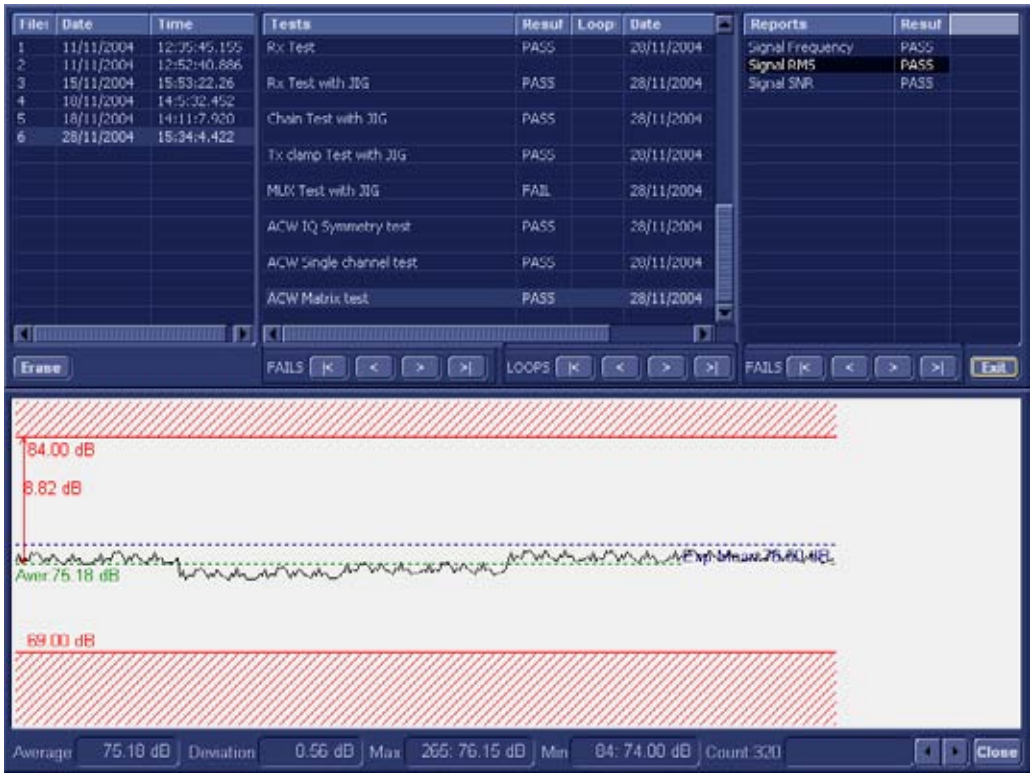

Figure 7-38 View Test Log - ACW Matrix Test - Signal RMS

9.) Use the tools provided to scroll through the channels and view the results, as previously described.

10) When done, trackball to the **Close** button and press **Set** to close the View Report window.

11) Select the third report (*Signal SNR*); the report is highlighted in the *Reports* list, and the corresponding results are shown in the Report window below, as shown in *Figure 7-39 - View Test Log - ACW Matrix Test - Signal SNR*.

7-4-6 Probe Select Board Diagnostic Tests (cont'd)

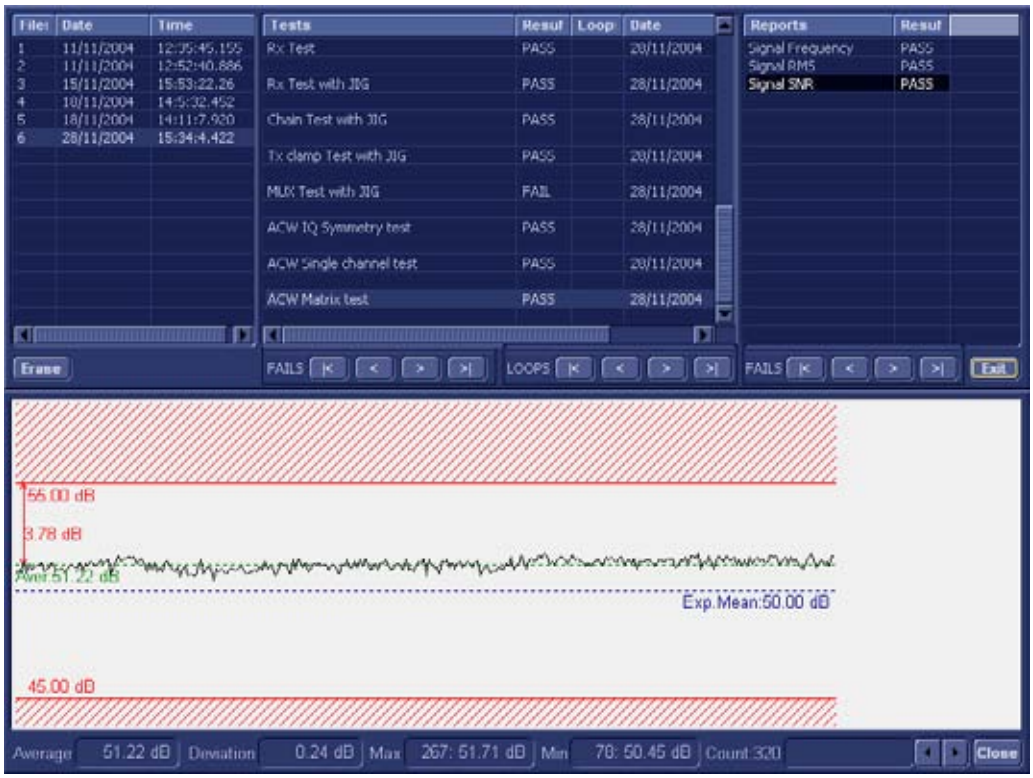

Figure 7-39 View Test Log - ACW Matrix Test - Signal SNR

12.) Use the tools provided to scroll through the channels and view the results, as previously described.

13) When done, trackball to the **Close** button and press **Set** to close the View Report window.

14) After reviewing the test results, proceed as follows:

- Re-boot the system (this is obligatory).
- Perform calibration, as described in "DC Offset Calibration" on page 7-24
- If no problems were identified but the problem persists, contact your local GE HEALTHCARE field engineer for assistance.
- If errors were identified and the results were not marginal, verify that all system cables and boards are connected (not misplaced) and functioning properly, as described in *Chapter 5 - Components and Function (Theory)*.

  If the problem persists, this indicates that either the specific board you tested is faulty or that another board that supports the operation of that board is faulty. Contact your local GE HEALTHCARE field engineer for assistance.

15.) Trackball to the **Exit** button and press **Set** to close the *View Test Log* dialog box.

16.) Press the <**Esc**> button on the keyboard to close the Diagnostic *Test Window*.

7-4-6 Probe Select Board Diagnostic Tests (cont'd)

7-4-6-2-3 ACW Delay Range Test

NOTE: For a description of this test, refer to the information in "ACW Delay Range Test" on page 7-12.

NOTICE **IMPORTANT** In order to access an individual board test, it is necessary to insert the service dongle from system boot-up and enter the Service Password.

NOTE: When performing this test, no probe should be connected to the system and nothing should be touching the probe connectors!

It is necessary to *disable* the Loop option where it should not be used.
After performing this test, you must re-boot the system and perform the DC Offset Calibration procedure as described in "DC Offset Calibration" on page 7-24.

1.) In the *Diagnostic Test* window, trackball to **ACW Delay Range Test** in the list of *ACW* tests available for selection from the Diagnostic Test Tree (see Figure 7-40 "ACW Delay Range Test" on page 7-68) and press **Set**. The ACW Delay Range Test name is displayed under *Execute;* the relevant system components to be tested are highlighted light blue in the Schematic View (PIB & PSB), as shown below:

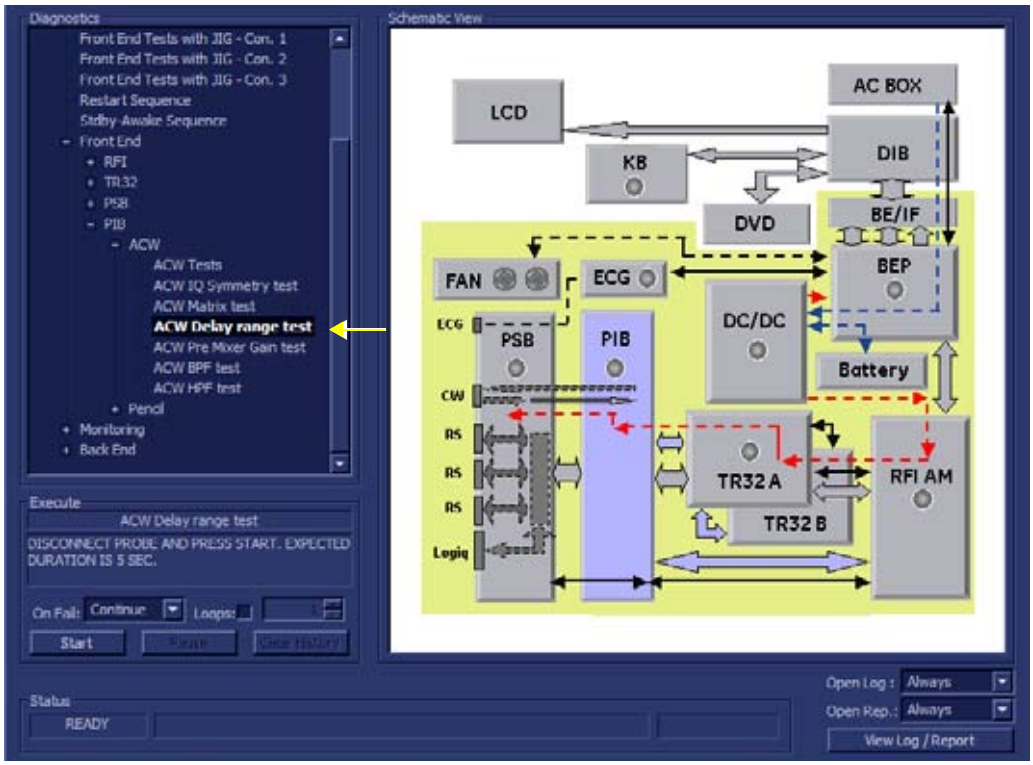

Figure 7-40 ACW Delay Range Test

2.) As indicated in the *Special Instructions* area, disconnect any probes currently connected to the system and make sure that nothing is touching the probe connectors.

3.) Adjacent to *On Fail,* select either **Stop** or **Continue**, as required. Stopping on failure enables you to review a failed test, the moment it fails. Alternatively, you may prefer testing to continue on failure and later you may review the report.

7-4-6 Probe Select Board Diagnostic Tests (cont'd)

4.) Trackball to the **Start** button and press **Set**.

The ACW Delay Range Test commences. While the test proceeds, the name of the test currently in progress (ACW IQ Delay Range Test) is displayed in the *Execute* field and the current *Loop #* and specific test are shown below. The messages *Init Done* and *Please Wait* are displayed beside the progress bar in the *Status* area.

As the testing sequence progresses, the progress bar will advance to reflect the test progress. Status indicators in the Data Flow map corresponding to the various system components will be highlighted in the appropriate color to indicate the current test status, as follows:

- **Green:** All recommended tests for these components have been completed and no problems were identified.
- **Red:** Problems were identified in these components during the performance of the test.
- **Yellow:** The tests executed so far on these components have passed, but not all recommended tests have been performed.

5.) At any stage, trackball to the **Pause** button and press **Set**, if required.

6.) To resume testing (from the point where you paused), trackball to the **Start** button and press **Set**.

When the ACW Delay Range Test sequence is complete:

- the *Diagnostic Test* window displays the Finished message
- the View Test Log window opens automatically, listing all tests performed and showing details of which tests passed or failed, as shown in the example in Figure 7-41 "View Test Log - ACW Delay Range Test - Signal Frequency" on page 7-69.

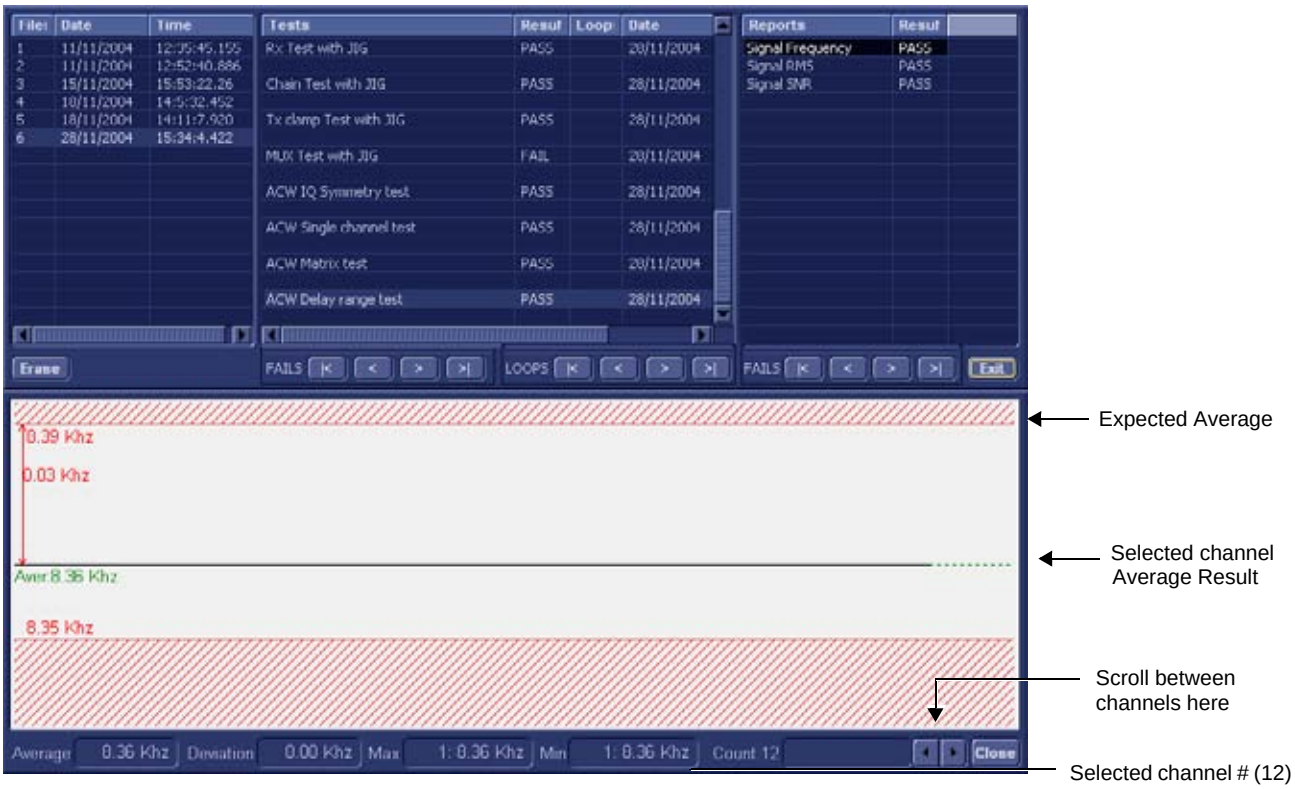

Figure 7-41 View Test Log - ACW Delay Range Test - Signal Frequency

7-4-6 Probe Select Board Diagnostic Tests (cont'd)

NOTE: The ACW Delay Range Test test has three test reports (Signal Frequency, Signal RMS, and Signal SNR) which are listed in the Reports window on the right. By default, the Signal Frequency report is displayed in the Reports window below (Figure 7-41 "View Test Log - ACW Delay Range Test - Signal Frequency" on page 7-69).

NOTE: Left and right arrows provided in the View Report window enable scrolling between the different channels.
Left-clicking on a currently-selected channel marks a red square on the report graph, and also evokes the display of the following information relative to that specific point: Average, Deviation (standard deviation from the Average), Max, and Min.
The signal should be within the limits marked in the white area (the dotted line represents the Average), as shown in Figure 7-41 "View Test Log - ACW Delay Range Test - Signal Frequency" on page 7-69.

7) When done, trackball to the **Close** button and press **Set** to close the View Report window.

8) Select the second report (*Signal RMS*); the report is highlighted in the *Reports* list, and the corresponding results are shown in the Report window below, as shown in Figure 7-42 "View Test Log - ACW Delay Range Test - Signal RMS" on page 7-70.

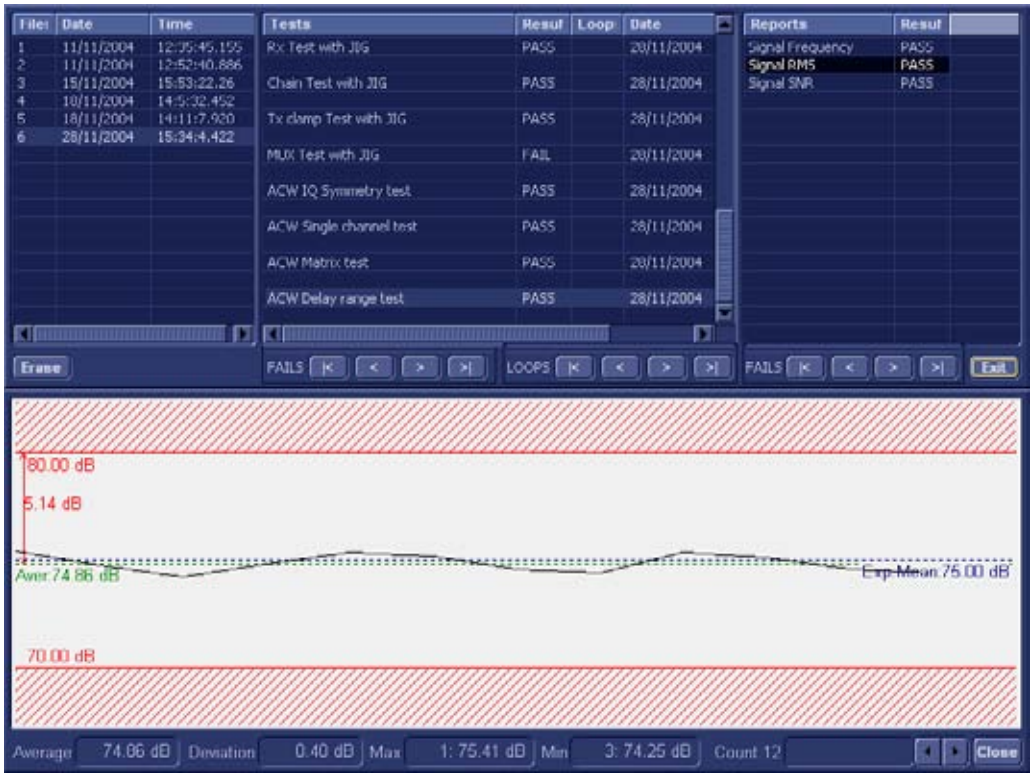

Figure 7-42 View Test Log - ACW Delay Range Test - Signal RMS

9.) Use the tools provided to scroll through the channels and view the results, as previously described.

10) When done, trackball to the **Close** button and press **Set** to close the View Report window.

11) Select the third report (*Signal SNR*); the report is highlighted in the *Reports* list, and the corresponding results are shown in the Report window below, as shown in Figure 7-43 "View Test Log - ACW Delay Range Test - Signal SNR" on page 7-71.

7-4-6 Probe Select Board Diagnostic Tests (cont'd)

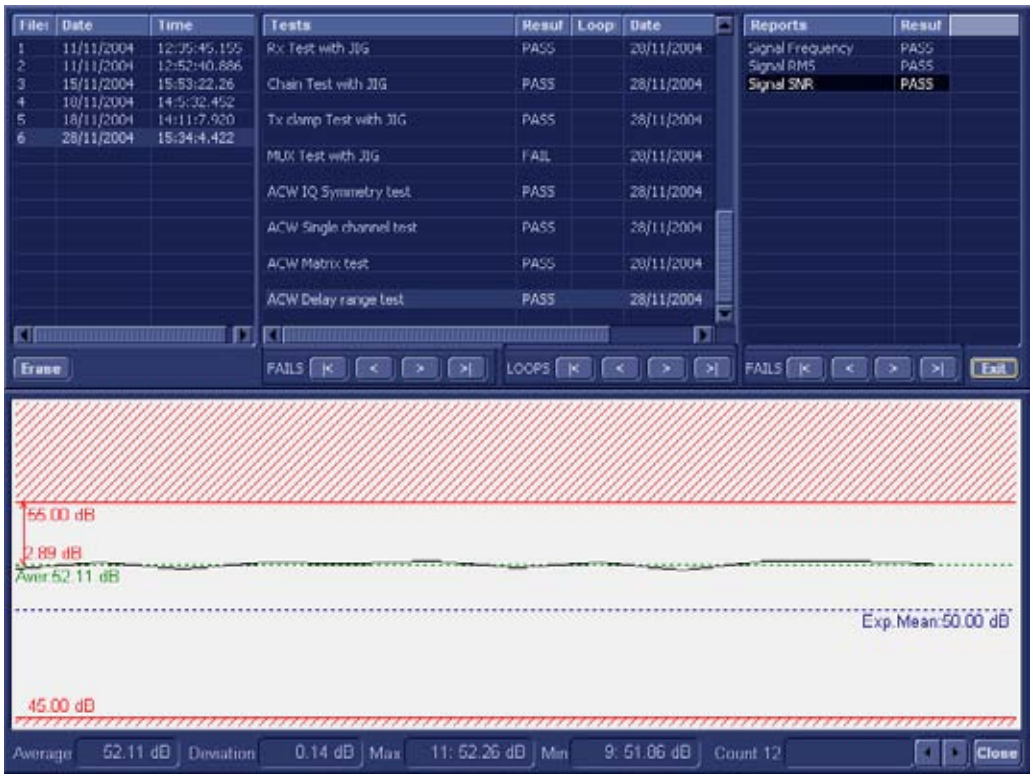

Figure 7-43 View Test Log - ACW Delay Range Test - Signal SNR

12.) Use the tools provided to scroll through the channels and view the results, as previously described.

13) When done, trackball to the **Close** button and press **Set** to close the View Report window.

14) After reviewing the test results, proceed as follows:

- Re-boot the system (this is obligatory).
- Perform calibration, as described in 7-4-2-1 "DC Offset Calibration" on page 7-24.
- If no problems were identified but the problem persists, contact your local GE HEALTHCARE field engineer for assistance.
- If errors were identified and the results were not marginal, verify that all system cables and boards are connected (not misplaced) and functioning properly, as described in *Chapter 5 - Components and Function (Theory)*.

  If the problem persists, this indicates that either the specific board you tested is faulty or that another board that supports the operation of that board is faulty. Contact your local GE HEALTHCARE field engineer for assistance.

15.) Trackball to the **Exit** button and press **Set** to close the *View Test Log* dialog box.

16.) Press the <**Esc**> button on the keyboard to close the Diagnostic *Test Window*.

7-4-6 Probe Select Board Diagnostic Tests (cont'd)

7-4-6-2-4 ACW Pre-Mixer Gain Test

NOTE: For a description of this test, refer to the information in - "ACW Pre-Mixer Gain Test" on page 7-12.

NOTICE In order to access an individual board test, it is necessary to insert the service dongle from system boot-up and enter the Service Password.

NOTE: When performing this test, no probe should be connected to the system and nothing should be touching the probe connectors!

NOTICE It is necessary to *disable* the Loop option where it should not be used.
After performing this test, you must re-boot the system and perform the DC Offset Calibration procedure as described in "DC Offset Calibration" on page 7-24.

1.) In the *Diagnostic Test* window, trackball to **ACW Pre-Mixer Gain Test** in the list of *ACW* tests available for selection from the Diagnostic Test Tree (see Figure 7-44 "ACW Pre-Mixer Gain Test" on page 7-72) and press **Set**. The ACW Pre-Mixer Gain Test name is displayed under *Execute;* the relevant system components to be tested are highlighted light blue in the Schematic View (PIB & PSB), as shown below:

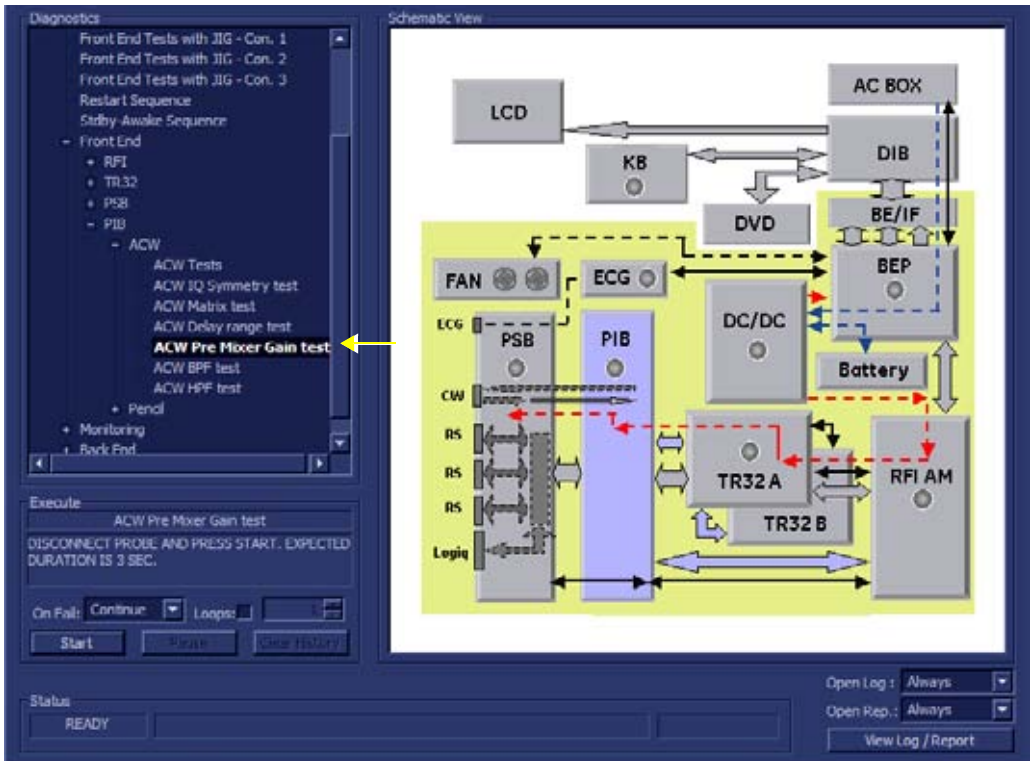

Figure 7-44 ACW Pre-Mixer Gain Test

2.) As indicated in the *Special Instructions* area, disconnect any probes currently connected to the system and make sure that nothing is touching the probe connectors.

3.) Adjacent to *On Fail,* select either **Stop** or **Continue**, as required. Stopping on failure enables you to review a failed test, the moment it fails. Alternatively, you may prefer testing to continue on failure and later you may review the report.

7-4-6 Probe Select Board Diagnostic Tests (cont'd)

4.) Trackball to the **Start** button and press **Set**.

The ACW Pre-Mixer Gain Test commences. While the test proceeds, the name of the test currently in progress (ACW Pre-Mixer Gain Test) is displayed in the *Execute* field and the current *Loop #* and specific test are shown below. The messages *Init Done* and *Please Wait* are displayed beside the progress bar in the *Status* area.

As the testing sequence progresses, the progress bar will advance to reflect the test progress. Status indicators in the Data Flow map corresponding to the various system components will be highlighted in the appropriate color to indicate the current test status, as follows:

- **Green:** All recommended tests for these components have been completed and no problems were identified.
- **Red:** Problems were identified in these components during the performance of the test.
- **Yellow:** The tests executed so far on these components have passed, but not all recommended tests have been performed.

5.) At any stage, trackball to the **Pause** button and press **Set**, if required.

6.) To resume testing (from the point where you paused), trackball to the **Start** button and press **Set**.

When the ACW Pre-Mixer Gain Test sequence is complete:

- the *Diagnostic Test* window displays the Finished message
- the View Test Log window opens automatically, listing all tests performed and showing details of which tests passed or failed, as shown in the example in Figure 7-45 "View Test Log - ACW Pre-Mixer Gain Test" on page 7-73.

Files Date Time
0 1/5/2006 14:12:30.551
1 1/5/2006 14:20:33.207
Tests Result Loops Date Time
DC offset calibration PASS 1/5/2006 14:20:35.2
DC offset verification PASS 1/5/2006 14:20:54.1
ACW Delay range test PASS 1/5/2006 14:23:30.3
ACW Pre Mixer Gain test PASS 1/5/2006 14:24:37.4
Reports Result
ACW Pre Mixer Gain report PASS
Erase
FAILS
LOOPS
FAILS
Exit
ACW Pre Mixer Gain report
Exit
Param Name Value Expecetd Range Pass/Fail
Frequency 0.36khz [0.37+/-0.02]khz - PASS
Gain1 Ref -9.82db > -15.00db - PASS
Gain2 Diff -2.28db [-2.20+/-0.50]db - PASS
Gain3 Diff -4.41db [-4.40+/-0.50]db - PASS

Figure 7-45 View Test Log - ACW Pre-Mixer Gain Test

7-4-6 Probe Select Board Diagnostic Tests (cont'd)

NOTE: The ACW Pre-Mixer Gain Test has one test report. By default, this is displayed in the Reports window below (Figure 7-45 "View Test Log - ACW Pre-Mixer Gain Test" on page 7-73).

7) When done, trackball to the **Exit** button and press **Set** to close the View Report window.

8) After reviewing the test results, proceed as follows:

- Re-boot the system (this is obligatory).
- Perform calibration, as described in 7-4-2-1 "DC Offset Calibration" on page 7-24.
- If no problems were identified but the problem persists, contact your local GE HEALTHCARE field engineer for assistance.
- If "Fail" appears in one of the Result columns, the test has failed, even if "Pass" appears in other columns. Repeat the ACW Pre-mixer Gain Test.
- If errors were identified and the results were not marginal, verify that all system cables and boards are connected (not misplaced) and functioning properly, as described in *Chapter 5 - Components and Function (Theory)*.

  If the problem persists, this indicates that either the specific board you tested is faulty or that another board that supports the operation of that board is faulty. Contact your local GE HEALTHCARE field engineer for assistance.

9.) Trackball to the **Exit** button and press **Set** to close the *View Test Log* dialog box.

10.) Press the <**Esc**> button on the keyboard to close the Diagnostic *Test Window*.

7-4-6-2-5 ACW BPF Test

NOTE: For a description of this test, refer to the information in - "ACW BPF Test" on page 7-12.

NOTICE **IMPORTANT** In order to access an individual board test, it is necessary to insert the service dongle from system boot-up and enter the Service Password.

NOTE: When performing this test, no probe should be connected to the system and nothing should be touching the probe connectors!

It is necessary to *disable* the Loop option where it should not be used.
After performing this test, you must re-boot the system and perform the DC Offset Calibration procedure as described in 7-4-2-1 "DC Offset Calibration" on page 7-24.

1.) In the *Diagnostic Test* window, trackball to **ACW BPF Test** in the list of *ACW* tests available for selection from the Diagnostic Test Tree (see Figure 7-46 "ACW BPF Test" on page 7-75) and press **Set**. The ACW BPF Test name is displayed under *Execute;* the relevant system components to be tested are highlighted light blue in the Schematic View (PIB & PSB), as shown below:

7-4-6 Probe Select Board Diagnostic Tests (cont'd)

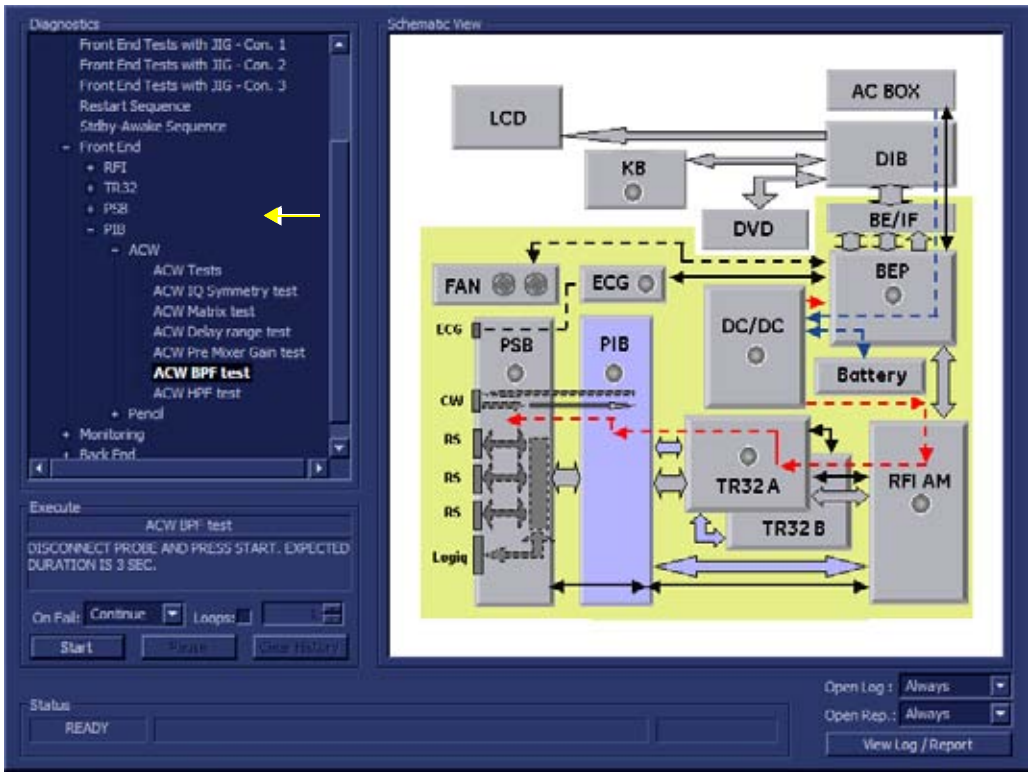

Figure 7-46 ACW BPF Test

2.) As indicated in the *Special Instructions* area, disconnect any probes currently connected to the system and make sure that nothing is touching the probe connectors.

3.) Adjacent to *On Fail,* select either **Stop** or **Continue**, as required. Stopping on failure enables you to review a failed test, the moment it fails. Alternatively, you may prefer testing to continue on failure and later you may review the report.

4.) Trackball to the **Start** button and press **Set**.

The ACW BPF Test commences. While the test proceeds, the name of the test currently in progress (ACW BPF Test) is displayed in the *Execute* field and the current *Loop #* and specific test are shown below. The messages *Init Done* and *Please Wait* are displayed beside the progress bar in the *Status* area.

As the testing sequence progresses, the progress bar will advance to reflect the test progress. Status indicators in the Data Flow map corresponding to the various system components will be highlighted in the appropriate color to indicate the current test status, as follows:

- **Green:** All recommended tests for these components have been completed and no problems were identified.
- **Red:** Problems were identified in these components during the performance of the test.
- **Yellow:** The tests executed so far on these components have passed, but not all recommended tests have been performed.

5.) At any stage, trackball to the **Pause** button and press **Set**, if required.

6.) To resume testing (from the point where you paused), trackball to the **Start** button and press **Set**.

7-4-6 Probe Select Board Diagnostic Tests (cont'd)

When the ACW BPF Test sequence is complete:

- the *Diagnostic Test* window displays the Finished message
- the View Test Log window opens automatically, listing all tests performed and showing details of which tests passed or failed, as shown in the example in Figure 7-47 "View Test Log - ACW BPF Test - BPF0" on page 7-76.

Figure 7-47 View Test Log - ACW BPF Test - BPF0

NOTE: The ACW BPF Test has four test reports (BPF0, BPF1, BPF2, and BPF3) which are listed in the Reports window on the right. By default, the BPF0 report is displayed in the Reports window below (Figure 7-47 "View Test Log - ACW BPF Test - BPF0" on page 7-76).

7) When finished reviewing the first report, trackball to the **Exit** button and press **Set** to close the View Report window.

8) Select the second report (*BPF1*); the report is highlighted in the *Reports* list, and the corresponding results are shown in the Report window below, as shown in Figure 7-48 "View Test Log - ACW BPF Test - BPF1" on page 7-77.

7-4-6 Probe Select Board Diagnostic Tests (cont'd)

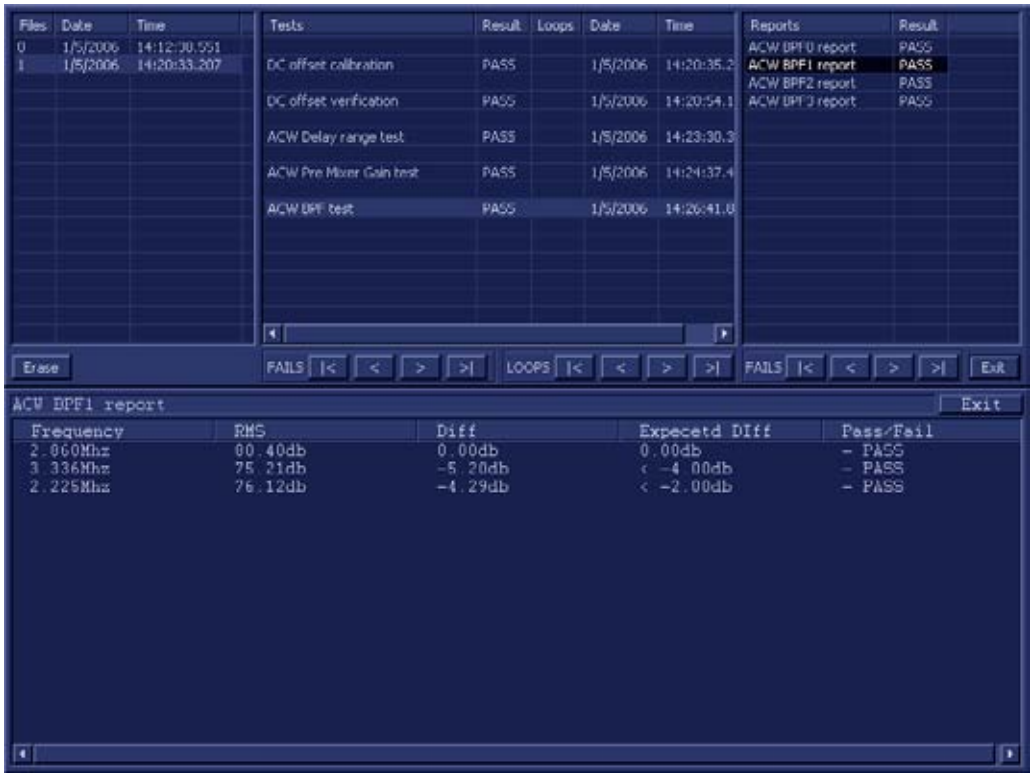
Files Date Time
0 1/5/2006 14:12:30.551
1 1/5/2006 14:20:33.207
Tests Result Loops Date Time
DC offset calibration PASS 1/5/2006 14:20:35.2
DC offset verification PASS 1/5/2006 14:20:54.1
ACW Delay range test PASS 1/5/2006 14:23:30.3
ACW Pre Mixer Gain test PASS 1/5/2006 14:24:37.4
ACW BPF test PASS 1/5/2006 14:26:41.0
Reports Result
ACW BPF 0 report PASS
ACW BPF1 report PASS
ACW BPF2 report PASS
ACW BPF 3 report PASS
Erase
FAILS |< < > >|
LOOPS |< < > >|
FAILS |< < > >|
ExR
ACW BPF1 report
Exit
Frequency RMS Diff Expecetd DIff Pass/Fail
2.060Mhz 80.40db 0.00db 0.00db - PASS
3.336Mhz 75.21db -5.20db < -4.00db - PASS
2.225Mhz 76.12db -4.29db < -2.00db - PASS

Figure 7-48 View Test Log - ACW BPF Test - BPF1

9.) Use the tools provided to scroll through the channels and view the results, as previously described.

10) When done, trackball to the **Close** button and press **Set** to close the View Report window.

11) Select the third report (*BPF2*); the report is highlighted in the *Reports* list, and the corresponding results are shown in the Report window below, as shown in Figure 7-49 "View Test Log - ACW BPF Test - BPF2" on page 7-78.

7-4-6 Probe Select Board Diagnostic Tests (cont'd)

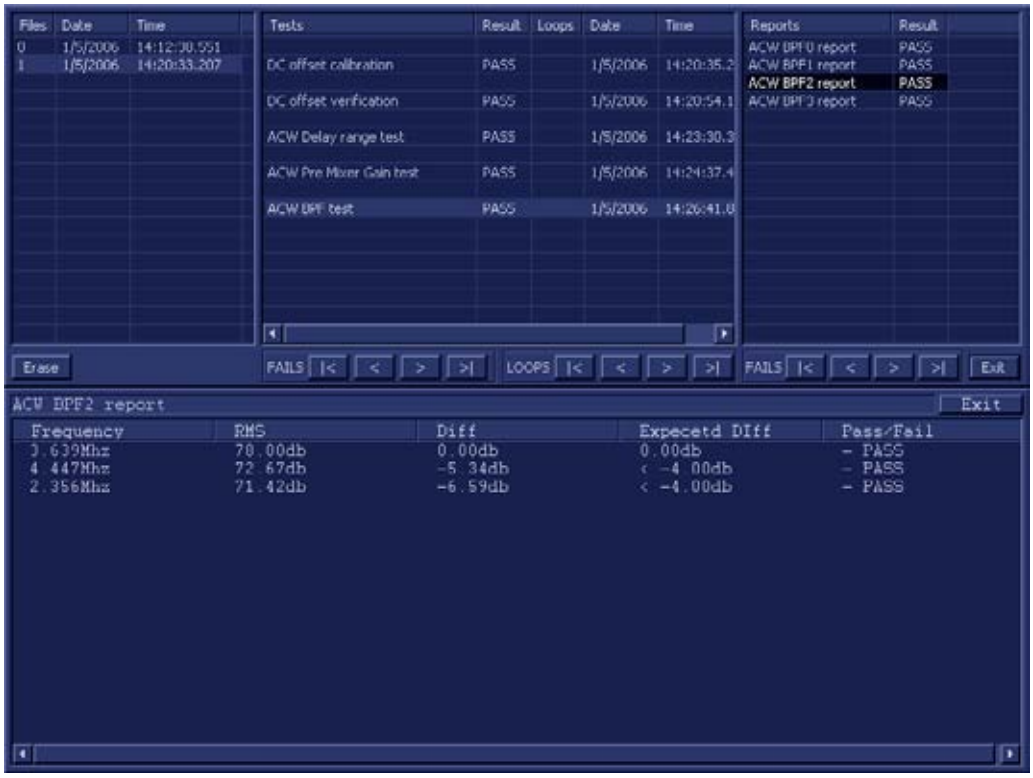

Figure 7-49 View Test Log - ACW BPF Test - BPF2

12.) Use the tools provided to scroll through the channels and view the results, as previously described.

13) When done, trackball to the **Close** button and press **Set** to close the View Report window.

14) Select the fourth report (*Signal SNR*); the report is highlighted in the *Reports* list, and the corresponding results are shown in the Report window below, as shown in Figure 7-50 "View Test Log - ACW BPF Test - BPF3" on page 7-79.

7-4-6 Probe Select Board Diagnostic Tests (cont'd)

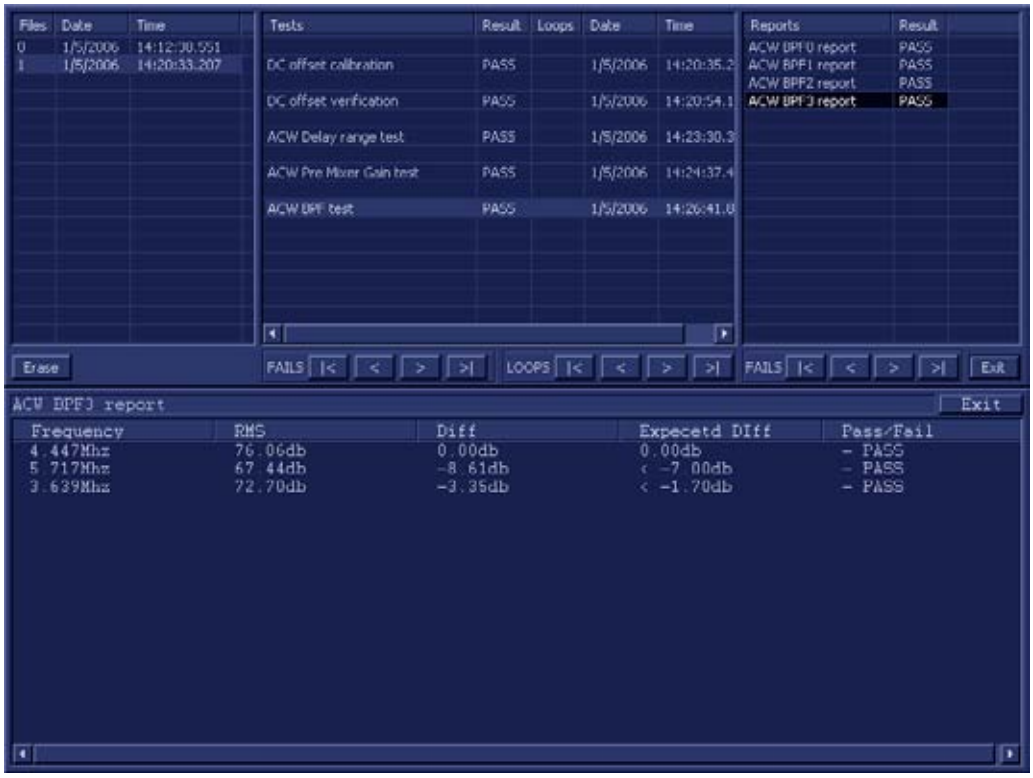

Figure 7-50 View Test Log - ACW BPF Test - BPF3

15.) Use the tools provided to scroll through the channels and view the results, as previously described.

16) When done, trackball to the **Close** button and press **Set** to close the View Report window.

17) After reviewing the test results, proceed as follows:

- Re-boot the system (this is obligatory).
- Perform calibration, as described in "DC Offset Calibration" on page 7-24.
- If no problems were identified but the problem persists, contact your local GE HEALTHCARE field engineer for assistance.
- If errors were identified and the results were not marginal, verify that all system cables and boards are connected (not misplaced) and functioning properly, as described in *Chapter 5 - Components and Function (Theory)*.

  If the problem persists, this indicates that either the specific board you tested is faulty or that another board that supports the operation of that board is faulty. Contact your local GE HEALTHCARE field engineer for assistance.

18.) Trackball to the **Exit** button and press **Set** to close the *View Test Log* dialog box.

19.) Press the <**Esc**> button on the keyboard to close the Diagnostic *Test Window*.

7-4-6 Probe Select Board Diagnostic Tests (cont'd)

7-4-6-2-6 ACW HPF Test

NOTE: For a description of this test, refer to the information in "ACW HPF Test" on page 7-12.

NOTICE In order to access an individual board test, it is necessary to insert the service dongle from system boot-up and enter the Service Password.

NOTE: When performing this test, no probe should be connected to the system and nothing should be touching the probe connectors!

NOTICE It is necessary to *disable* the Loop option where it should not be used.
After performing this test, you must re-boot the system and perform the DC Offset Calibration procedure as described in "DC Offset Calibration" on page 7-24.

1.) In the *Diagnostic Test* window, trackball to **ACW HPF Test** in the list of *ACW* tests available for selection from the Diagnostic Test Tree (see Figure 7-51 "ACW HPF Test" on page 7-80) and press **Set**. The ACW HPF Test name is displayed under *Execute;* the relevant system components to be tested are highlighted light blue in the Schematic View (PIB & PSB), as shown below:

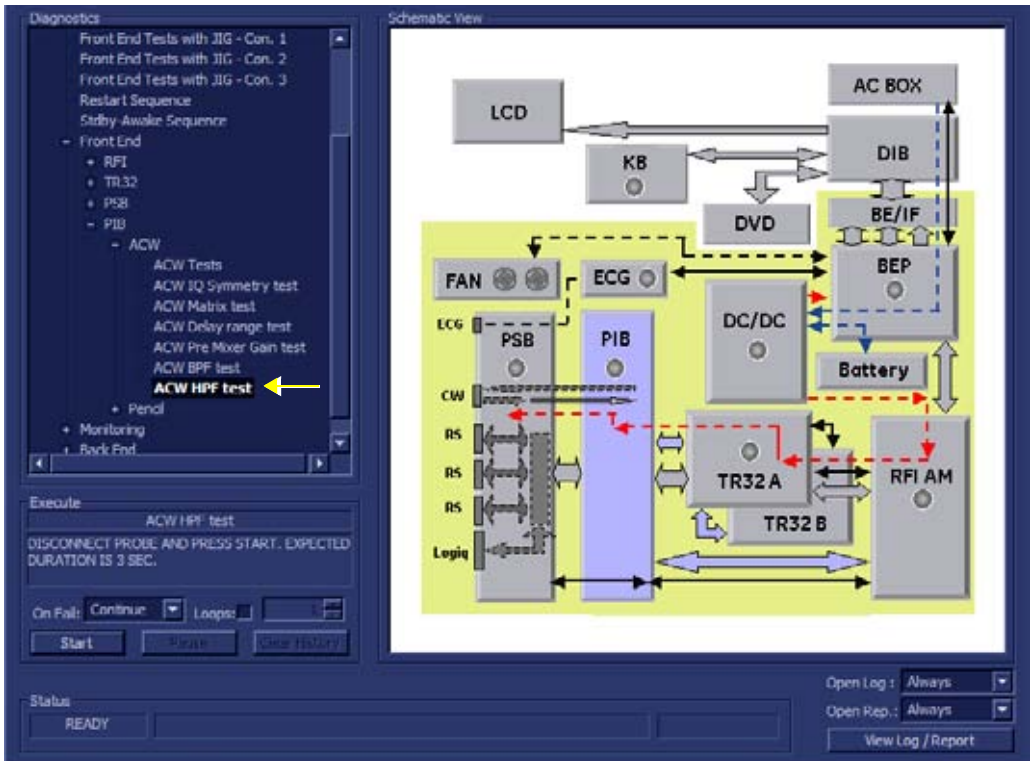

Figure 7-51 ACW HPF Test

2.) As indicated in the *Special Instructions* area, disconnect any probes currently connected to the system and make sure that nothing is touching the probe connectors.

3.) Adjacent to *On Fail,* select either **Stop** or **Continue**, as required. Stopping on failure enables you to review a failed test, the moment it fails. Alternatively, you may prefer testing to continue on failure and later you may review the report.

7-4-6 Probe Select Board Diagnostic Tests (cont'd)

4.) Trackball to the **Start** button and press **Set**.

The ACW HPF Test commences. While the test proceeds, the name of the test currently in progress (ACW HPF Test) is displayed in the *Execute* field and the current *Loop #* and specific test are shown below. The messages *Init Done* and *Please Wait* are displayed beside the progress bar in the *Status* area.

As the testing sequence progresses, the progress bar will advance to reflect the test progress. Status indicators in the Data Flow map corresponding to the various system components will be highlighted in the appropriate color to indicate the current test status, as follows:

- **Green:** All recommended tests for these components have been completed and no problems were identified.
- **Red:** Problems were identified in these components during the performance of the test.
- **Yellow:** The tests executed so far on these components have passed, but not all recommended tests have been performed.

5.) At any stage, trackball to the **Pause** button and press **Set**, if required.

6.) To resume testing (from the point where you paused), trackball to the **Start** button and press **Set**.

When the ACW HPF Test sequence is complete:

- the *Diagnostic Test* window displays the Finished message
- the View Test Log window opens automatically, listing all tests performed and showing details of which tests passed or failed, as shown in the example in Figure 7-52 "View Test Log - ACW HPF Test - 300" on page 7-81.

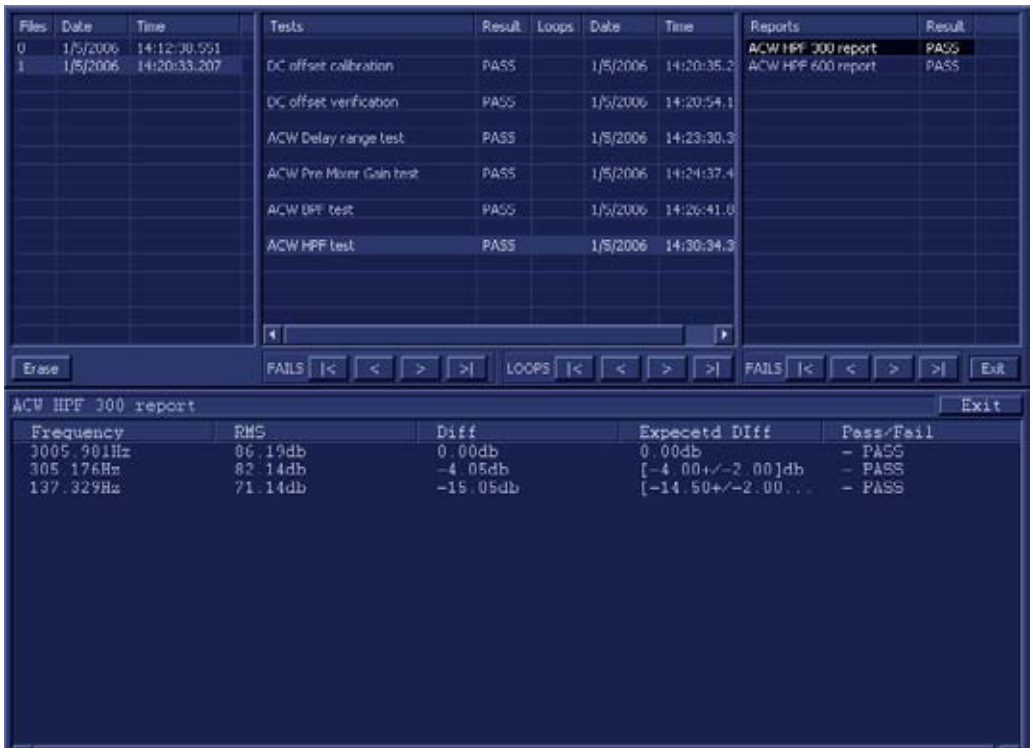

Figure 7-52 View Test Log - ACW HPF Test - 300

NOTE: The ACW HPF Test has two test reports (HPF300 and HPF600) which are listed in the Reports window on the right. By default, the HPF300 report is displayed in the Reports window below (Figure 7-52 "View Test Log - ACW HPF Test - 300" on page 7-81).

7-4-6 Probe Select Board Diagnostic Tests (cont'd)

7) When finished reviewing the first report, trackball to the **Exit** button and press **Set** to close the View Report window.

8) Select the second report (*HPF600*); the report is highlighted in the *Reports* list, and the corresponding results are shown in the Report window below, as shown in Figure 7-53 "View Test Log - ACW HPF Test - 600" on page 7-82.

Figure 7-53 View Test Log - ACW HPF Test - 600

9) When done, trackball to the **Exit** button and press **Set** to close the View Report window.

10) After reviewing the test results, proceed as follows:

- Re-boot the system (this is obligatory).
- Perform calibration, as described in "DC Offset Calibration" on page 7-24.
- If no problems were identified but the problem persists, contact your local GE HEALTHCARE field engineer for assistance.
- If errors were identified and the results were not marginal, verify that all system cables and boards are connected (not misplaced) and functioning properly, as described in *Chapter 5* - Components and Function (Theory).

  If the problem persists, this indicates that either the specific board you tested is faulty or that another board that supports the operation of that board is faulty. Contact your local GE HEALTHCARE field engineer for assistance.

11.) Trackball to the **Exit** button and press **Set** to close the *View Test Log* dialog box.

12.) Press the <**Esc**> button on the keyboard to close the Diagnostic *Test Window*.

7-4-6 Probe Select Board Diagnostic Tests (cont'd)

7-4-6-2-7 Pencil Rx Test

NOTE: For a description of this test, refer to the information in - "Pencil Rx Test" on page 7-13.

NOTICE **IMPORTANT** In order to access an individual board test, it is necessary to insert the service dongle from system boot-up and enter the Service Password.

NOTE: When performing this test, no probe should be connected to the system and nothing should be touching the probe connectors!

1.) In the *Diagnostic Test* window, trackball to **Pencil RX Test** in the list of *Pencil* tests available for selection from the Diagnostic Test Tree (see Figure 7-54 "Pencil RX Test" on page 7-83) and press **Set**. The Pencil RX Test name is displayed under *Execute;* the relevant system components to be tested are highlighted light blue in the Schematic View (PIB & PSB), as shown below:

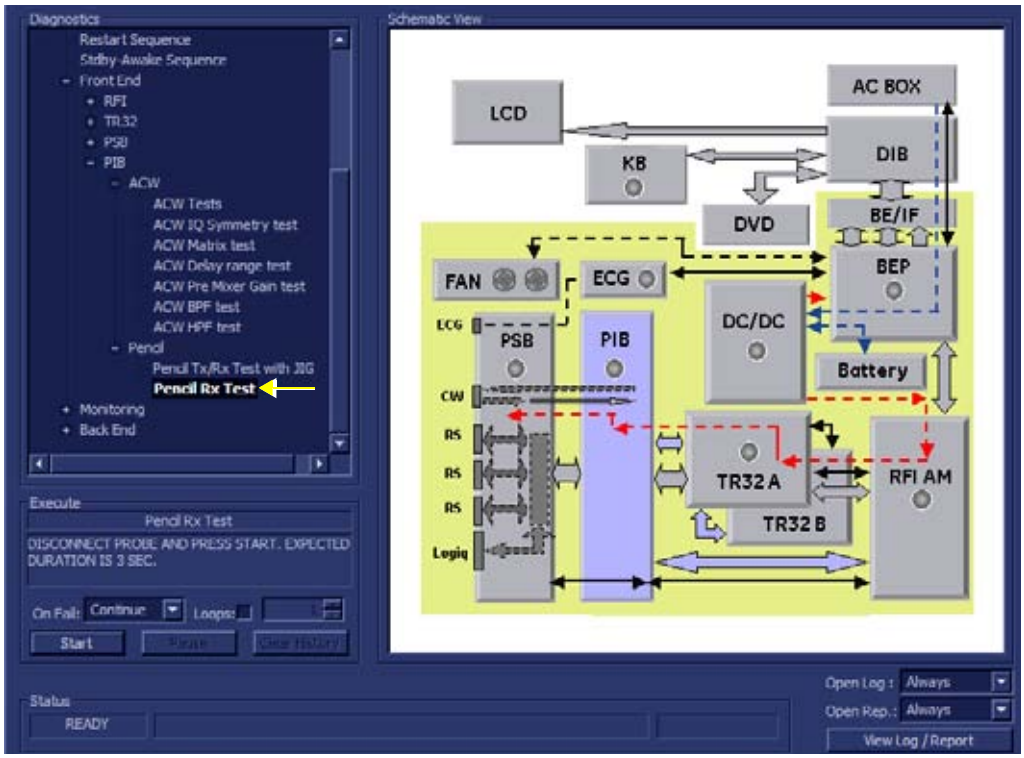

Figure 7-54 Pencil RX Test

2.) As indicated in the *Special Instructions* area, disconnect any probes currently connected to the system and make sure that nothing is touching the probe connectors.

3.) Under the *Special Instructions* area, activate the **Loops** checkbox and select the required number of *Loops* from the combo box.

4.) Adjacent to *On Fail,* select either **Stop** or **Continue**, as required. Stopping on failure enables you to review a failed test, the moment it fails. Alternatively, you may prefer testing to continue on failure and later you may review the report.

5.) Trackball to the **Start** button and press **Set**.

The Pencil RX Test commences. While the test proceeds, the name of the test currently in progress (Pencil RX Test) is displayed in the *Execute* field and the current *Loop #* and specific test are shown below. The messages *Init Done* and *Please Wait* are displayed beside the progress bar in the *Status* area.

As the testing sequence progresses, the progress bar will advance to reflect the test progress. Status indicators in the Data Flow map corresponding to the various system components will be highlighted in the appropriate color to indicate the current test status, as follows:

- **Green:** All recommended tests for these components have been completed and no problems were identified.
- **Red:** Problems were identified in these components during the performance of the test.
- **Yellow:** The tests executed so far on these components have passed, but not all recommended tests have been performed.

6.) At any stage, trackball to the **Pause** button and press **Set**, if required.

7.) To resume testing (from the point where you paused), trackball to the **Start** button and press **Set**. When the Pencil RX Test sequence is complete:

- the *Diagnostic Test* window displays the Finished message
- the View Test Log window opens automatically, listing all tests performed and showing details of which tests passed or failed, as shown in the example in *Figure 7-55 - View Test Log - Pencil RX Test*.

Figure 7-55 View Test Log - Pencil RX Test

NOTE: The Pencil RX Test has one test report which is listed in Reports on the right and displayed in the Reports window below (Figure 7-55 "View Test Log - Pencil RX Test" on page 7-84).

8) When finished reviewing the first report, trackball to the **Exit** button and press **Set** to close the View Report window.

9) After reviewing the test results, proceed as follows:

- If no problems were identified, it is recommended to re-boot the system (this is obligatory when prompted).
- If no problems were identified but the problem persists, contact your local GE HEALTHCARE

field engineer for assistance.

- If errors were identified but the results were marginal, perform calibration, as described in "DC Offset Calibration" on page 7-24, and then repeat the test.
- If errors were identified and the results were not marginal, verify that all system cables and boards are connected (not misplaced) and functioning properly, as described in *Chapter 5 - Components and Function (Theory)*.

  If the problem persists, this indicates that either the specific board you tested is faulty or that another board that supports the operation of that board is faulty. Contact your local GE HEALTHCARE field engineer for assistance.

10.) Trackball to the **Exit** button and press **Set** to close the *View Test Log* dialog box.

11.) Press the <**Esc**> button on the keyboard to close the Diagnostic *Test Window*.

Section 7-5
Monitoring Tests

7-5-1 Accessing the Monitoring Diagnostic Test Options

- Access the *Diagnostic Test* window, as described in the 7-4-1 "Accessing the Front End Diagnostic Options" on page 7-24.

7-5-1-1 Full System Monitoring Test

NOTE: For a description of this test, refer to the information in "Full System Monitoring Test" on page 7-13.

NOTICE **IMPORTANT** In order to access an individual board test, it is necessary to insert the service dongle from system boot-up and enter the Service Password.

1.) In the *Diagnostic Test* window, trackball to **Full System Monitoring Test** in the list of *Monitoring* tests available for selection from the Diagnostic Test Tree (see Figure 7-56 "Full System Monitoring Test" on page 7-86) and press **Set**. The Full System Monitoring Test name is displayed under *Execute;* all system components to be tested are highlighted light blue in the Schematic View, as shown below:

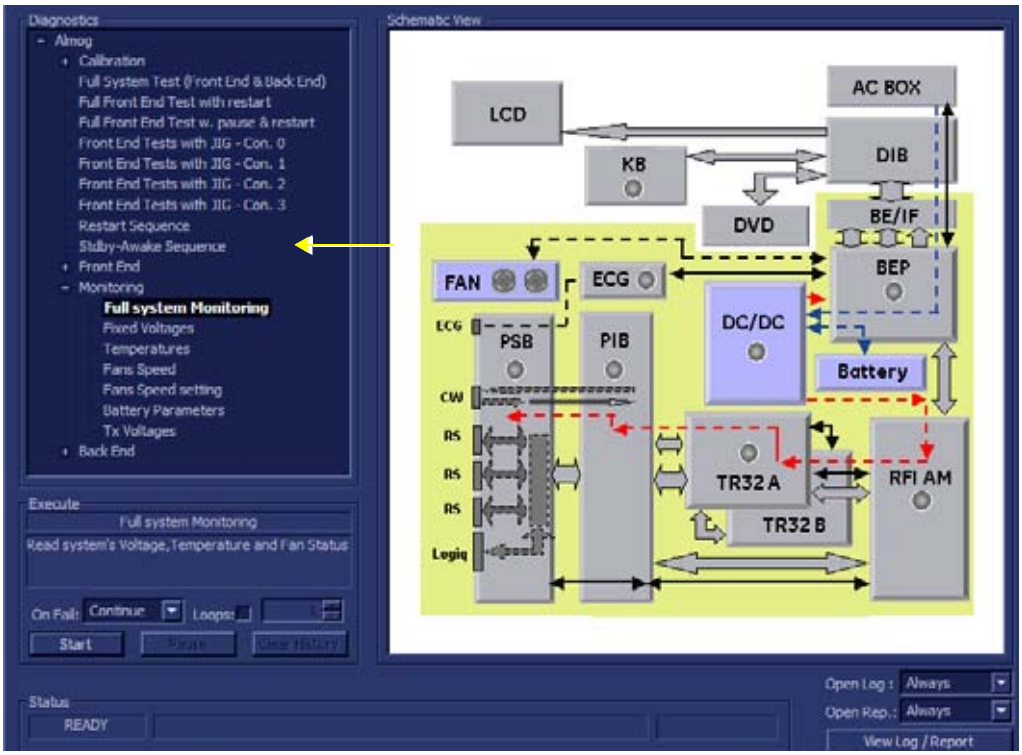

Figure 7-56 Full System Monitoring Test

2.) As indicated in the *Special Instructions* area, disconnect any probes currently connected to the system and make sure that nothing is touching the probe connectors.

3.) Under the *Special Instructions* area, activate the **Loops** checkbox and select the required number of *Loops* from the combo box.

4.) Adjacent to *On Fail,* select either **Stop** or **Continue**, as required. Stopping on failure enables you to review a failed test, the moment it fails. Alternatively, you may prefer testing to continue on failure and later you may review the report.

5.) Trackball to the **Start** button and press **Set**.

7-4-6 Probe Select Board Diagnostic Tests (cont'd)

The Full System Monitoring Test commences. While the test proceeds, the name of the test currently in progress (ADC Test) is displayed in the *Execute* field and the current *Loop #* and specific test are shown below. The messages *Init Done* and *Please Wait* are displayed beside the progress bar in the *Status* area.

As the testing sequence progresses, the progress bar will advance to reflect the test progress. Status indicators in the Data Flow map corresponding to the various system components will be highlighted in the appropriate color to indicate the current test status, as follows:

- **Green:** All recommended tests for these components have been completed and no problems were identified.
- **Red:** Problems were identified in these components during the performance of the test.
- **Yellow:** The tests executed so far on these components have passed, but not all recommended tests have been performed.

6.) At any stage, trackball to the **Pause** button and press **Set**, if required.

7.) To resume testing (from the point where you paused), trackball to the **Start** button and press **Set**.

When the Full System Monitoring Test sequence is complete:

- the *Diagnostic Test* window displays the Finished message
- the View Test Log window opens automatically, listing all tests performed and showing details of which tests passed or failed, as shown in the example in Figure 7-57 "View Test Log - Full System Monitoring Test" on page 7-87.

Figure 7-57 View Test Log - Full System Monitoring Test

NOTE: The Full System Monitoring Test has five sub-tests (Fixed Voltages, Temperatures, Fans Speed, Battery Parameters, and Tx Voltages). These are listed in the Test column, as shown in Figure 7-57 "View Test Log - Full System Monitoring Test" on page 7-87.

8.) Select the first report (Fixed Voltages); the report is highlighted in the *Reports* list, and the corresponding results are shown in the Report window below, as shown in Figure 7-58 "View Test Log - Full System Monitoring Test - Fixed Voltages" on page 7-88.

7-5-1 Accessing the Monitoring Diagnostic Test Options (cont'd)

Figure 7-58 View Test Log - Full System Monitoring Test - Fixed Voltages

9.) Check that the sub-test passed and that result values are within the pre-defined *Max* and *Min* limits, as shown in Figure 7-58 "View Test Log - Full System Monitoring Test - Fixed Voltages" on page 7-88.

10.) Select the second report (Temperatures); the report is highlighted in the *Reports* list, and the corresponding results are shown in the Report window below, as shown in Figure 7-59 "View Test Log - Full System Monitoring Test - Temperatures" on page 7-89.

7-5-1 Accessing the Monitoring Diagnostic Test Options (cont'd)

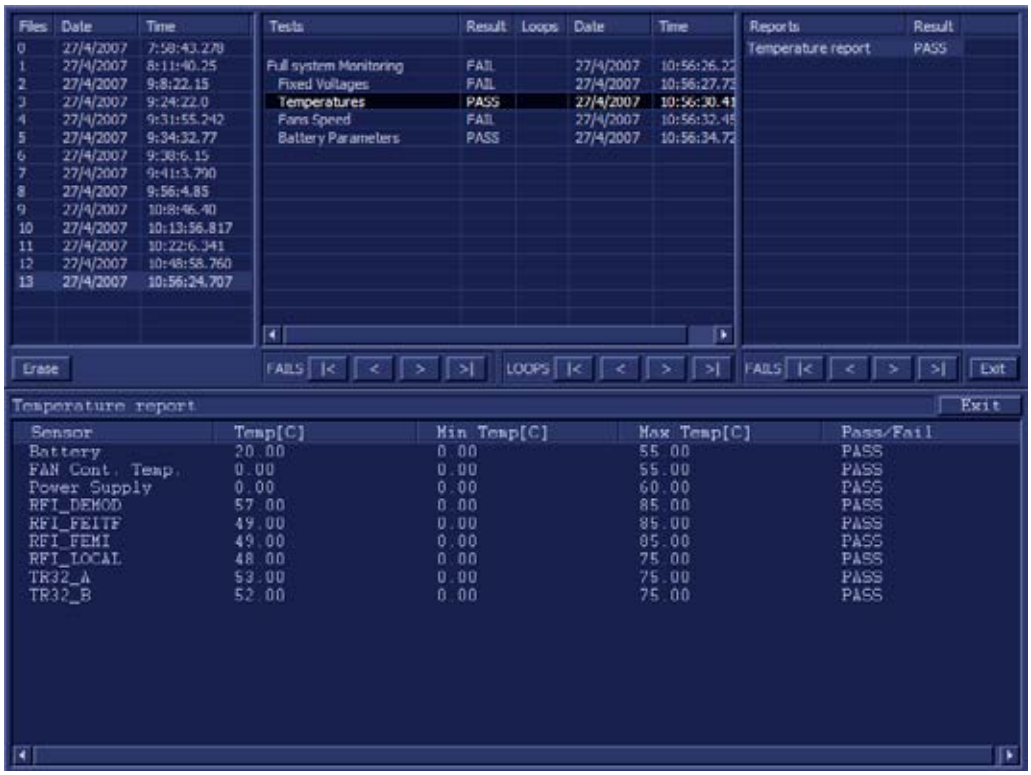

Figure 7-59 View Test Log - Full System Monitoring Test - Temperatures

11.) Check that the sub-test passed and that result values are within the pre-defined *Max* and *Min* limits, as shown in Figure 7-59 "View Test Log - Full System Monitoring Test - Temperatures" on page 7-89.

12.) Select the third report (Fans Speed); the report is highlighted in the *Reports* list, and the corresponding results are shown in the Report window below, as shown in Figure 7-60 "View Test Log - Full System Monitoring Test - Fans Speed" on page 7-90.

7-5-1 Accessing the Monitoring Diagnostic Test Options (cont'd)

Figure 7-60 View Test Log - Full System Monitoring Test - Fans Speed

13.) Check that the sub-test passed and that result values are within the pre-defined *Max* and *Min* limits, as shown in Figure 7-58 "View Test Log - Full System Monitoring Test - Fixed Voltages" on page 7-88.

14.) Select the fourth report (Battery Parameters); the report is highlighted in the *Reports* list, and the corresponding results are shown in the Report window below, as shown in Figure 7-61 "View Test Log - Full System Monitoring Test - Battery Parameters" on page 7-91.

7-5-1 Accessing the Monitoring Diagnostic Test Options (cont'd)

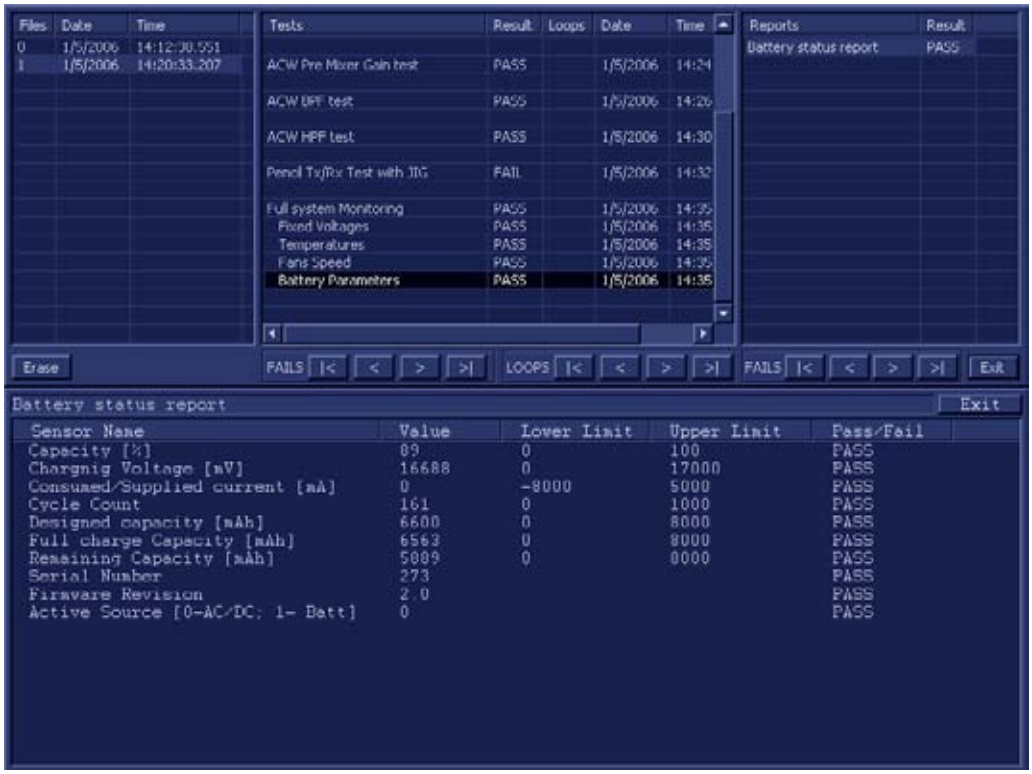
Files Date Time
0 1/5/2006 14:12:30.551
1 1/5/2006 14:20:33.207
Tests Result Loops Date Time
ACW Pre Mixer Gain test PASS 1/5/2006 14:24
ACW BPF test PASS 1/5/2006 14:26
ACW HPF test PASS 1/5/2006 14:30
Pencil Tx/Rx Test with JIG FAIL 1/5/2006 14:32
Full system Monitoring PASS 1/5/2006 14:35
Fixed Voltages PASS 1/5/2006 14:35
Temperatures PASS 1/5/2006 14:35
Fans Speed PASS 1/5/2006 14:35
Battery Parameters PASS 1/5/2006 14:35
Reports Result
Battery status report PASS
Erase
FAILS |< < > >|
LOOPS |< < > >|
FAILS |< < > >|
Exit
Battery status report
Exit
Sensor Name Value Lower Limit Upper Limit Pass/Fail
Capacity [%] 09 0 100 PASS
Chargnig Voltage [mV] 16688 0 17000 PASS
Consumed/Supplied current [mA] 0 -8000 5000 PASS
Cycle Count 161 0 1000 PASS
Designed capacity [mAh] 6600 0 8000 PASS
Full charge Capacity [mAh] 6563 0 8000 PASS
Remaining Capacity [mAh] 5089 0 0000 PASS
Serial Number 273 PASS
Firmware Revision 2.0 PASS
Active Source [0-AC/DC; 1- Batt] 0 PASS

Figure 7-61 View Test Log - Full System Monitoring Test - Battery Parameters

15.) Check that the sub-test passed and that result values are within the pre-defined *Upper* and *Lower* limits, as shown in Figure 7-61 "View Test Log - Full System Monitoring Test - Battery Parameters" on page 7-91.

16.) Select the fifth report (Tx Voltages); the report is highlighted in the *Reports* list, and the corresponding results are shown in the Report window below, as shown in Figure 7-62 "View Test Log - Full System Monitoring Test - Tx Voltages" on page 7-92.

7-5-1 Accessing the Monitoring Diagnostic Test Options (cont'd)

Figure 7-62 View Test Log - Full System Monitoring Test - Tx Voltages

17.) Check that the sub-test passed and that result values are within the pre-defined *Max* and *Min* limits, as shown in Figure 7-62 "View Test Log - Full System Monitoring Test - Tx Voltages" on page 7-92.

18) When done, trackball to the **Exit** button and press **Set** to close the View Report window.

19) After reviewing the test results, proceed as follows:

- If no problems were identified, it is recommended to re-boot the system (this is obligatory when prompted).
- If no problems were identified but the problem persists, contact your local GE HEALTHCARE field engineer for assistance.
- If errors were identified but the results were marginal, perform calibration, as described in "DC Offset Calibration" on page 7-24, and then repeat the test.
- If errors were identified and the results were not marginal, verify that all system cables and boards are connected (not misplaced) and functioning properly, as described in *Chapter 5 - Components and Function (Theory)*.

  If the problem persists, this indicates that either the specific board you tested is faulty or that another board that supports the operation of that board is faulty. Contact your local GE HEALTHCARE field engineer for assistance.

20.) Trackball to the **Exit** button and press **Set** to close the *View Test Log* dialog box.

21.) Press the <**Esc**> button on the keyboard to close the Diagnostic *Test Window*.

7-5-1 Accessing the Monitoring Diagnostic Test Options (cont'd)

7-5-1-2 Fixed Voltages Test

NOTE: For a description of this test, refer to the information in 7-2-4-3-2 "Fixed Voltages Test" on page 7-13.

NOTICE **IMPORTANT** In order to access an individual board test, it is necessary to insert the service dongle from system boot-up and enter the Service Password.

1.) In the *Diagnostic Test* window, trackball to **Fixed Voltages** in the list of *Monitoring* tests available for selection from the Diagnostic Test Tree (see Figure 7-63 "Voltages Test" on page 7-93) and press **Set**. The Fixed Voltages Test name is displayed under *Execute;* the relevant system components to be tested are highlighted light blue in the Schematic View (AC/DC, Battery, PS), as shown below:

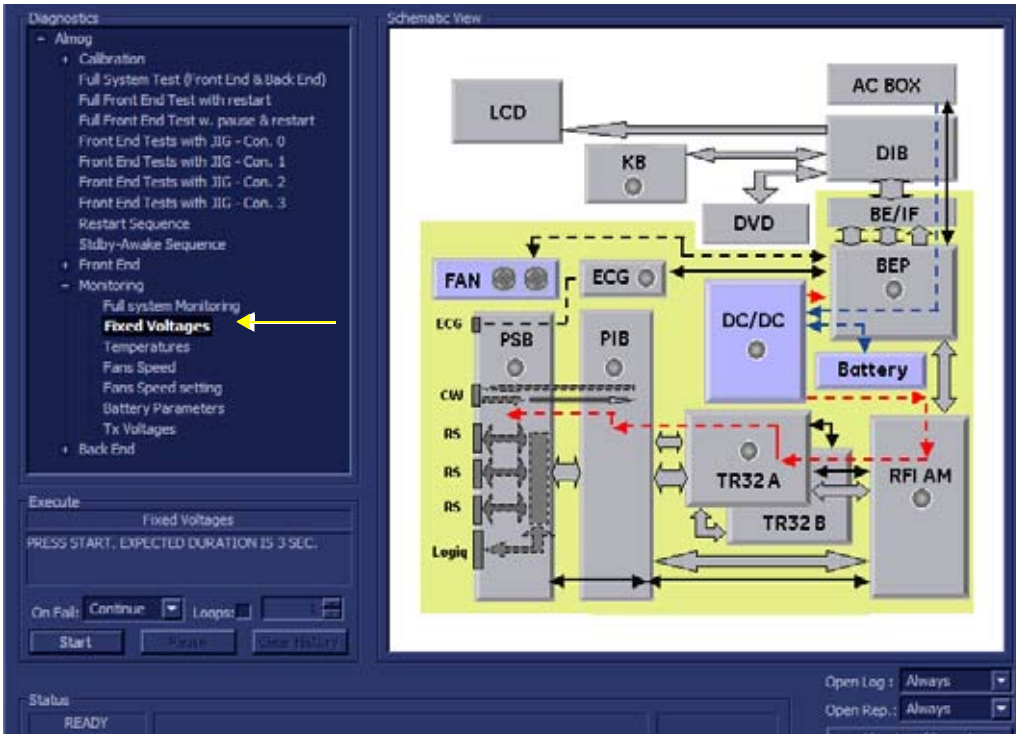

Figure 7-63 Voltages Test

2.) Under the *Special Instructions* area, activate the **Loops** checkbox and select the required number of *Loops* from the combo box.

3.) Adjacent to *On Fail,* select either **Stop** or **Continue**, as required. Stopping on failure enables you to review a failed test, the moment it fails. Alternatively, you may prefer testing to continue on failure and later you may review the report.

4.) Trackball to the **Start** button and press **Set**.

The Fixed Voltages Test commences. While the test proceeds, the name of the test currently in progress (Fixed Voltages) is displayed in the *Execute* field and the current *Loop #* and specific test are shown below. The messages *Init Done* and *Please Wait* are displayed beside the progress bar in the *Status* area.

As the testing sequence progresses, the progress bar will advance to reflect the test progress. Status indicators in the Data Flow map corresponding to the various system components will be highlighted in the appropriate color to indicate the current test status, as follows:

7-5-1 Accessing the Monitoring Diagnostic Test Options (cont'd)

- **Green:** All recommended tests for these components have been completed and no problems were identified.
- **Red:** Problems were identified in these components during the performance of the test.
- **Yellow:** The tests executed so far on these components have passed, but not all recommended tests have been performed.

5.) At any stage, trackball to the **Pause** button and press **Set**, if required.

6.) To resume testing (from the point where you paused), trackball to the **Start** button and press **Set**.

When the Fixed Voltages Test sequence is complete:

- the *Diagnostic Test* window displays the Finished message
- the View Test Log window opens automatically, listing all tests performed and showing details of which tests passed or failed, as shown in the example in Figure 7-64 "View Test Log - Fixed Voltages Test" on page 7-94.

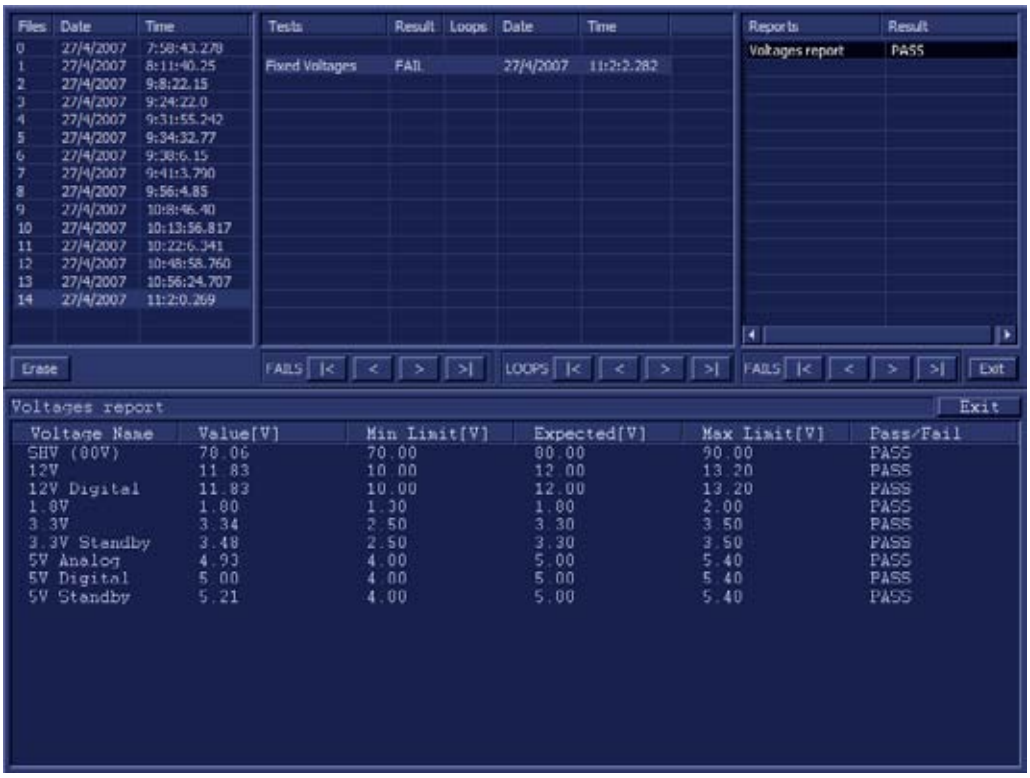

Figure 7-64 View Test Log - Fixed Voltages Test

NOTE: For this test, there is one report (Voltages) which is listed in the Reports window on the right. By default, this report is displayed in the Reports window below.

7.) Check that the test passed and that result values are within the pre-defined *Max* and *Min* limits, as shown in Figure 7-64 "View Test Log - Fixed Voltages Test" on page 7-94.

8) When done, trackball to the **Exit** button and press **Set** to close the View Report window.

9) After reviewing the test results, proceed as follows:

- If no problems were identified, it is recommended to re-boot the system (this is obligatory when prompted).

7-5-1 Accessing the Monitoring Diagnostic Test Options (cont'd)

- If no problems were identified but the problem persists, contact your local GE HEALTHCARE field engineer for assistance.
- If errors were identified but the results were marginal, perform calibration, as described in "DC Offset Calibration" on page 7-24, and then repeat the test.
- If errors were identified and the results were not marginal, verify that all system cables and boards are connected (not misplaced) and functioning properly, as described in *Chapter 5 - Components and Function (Theory)*.

  If the problem persists, this indicates that either the specific board you tested is faulty or that another board that supports the operation of this board is faulty. Contact your local GE HEALTHCARE field engineer for assistance.

10.) Trackball to the **Exit** button and press **Set** to close the *View Test Log* dialog box.

11.) Press the <**Esc**> button on the keyboard to close the Diagnostic *Test Window*.

7-5-1-3 Temperatures Test

NOTE: For a description of this test, refer to the information in 7-2-4-3-3 "Temperatures Test" on page 7-13.

NOTICE **IMPORTANT** In order to access an individual board test, it is necessary to insert the service dongle from system boot-up and enter the Service Password.

1.) In the *Diagnostic Test* window, trackball to **Temperatures** in the list of *Monitoring* tests available for selection from the Diagnostic Test Tree (see Figure 7-65 "Temperatures Test" on page 7-95) and press **Set**. The Temperatures Test name is displayed under *Execute;* all system components (excluding the P&M) will be tested are highlighted light blue in the Schematic View (all), as shown below:

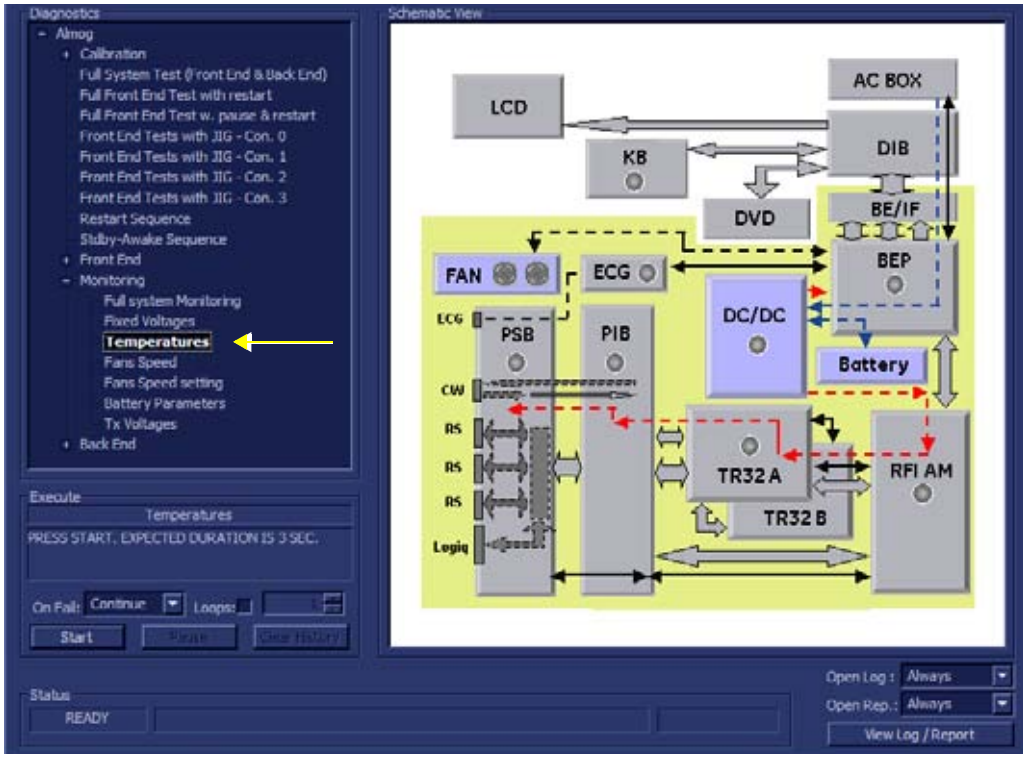

Figure 7-65 Temperatures Test

7-5-1 Accessing the Monitoring Diagnostic Test Options (cont'd)

2.) Under the *Special Instructions* area, activate the **Loops** checkbox and select the required number of *Loops* from the combo box.

3.) Adjacent to *On Fail,* select either **Stop** or **Continue**, as required. Stopping on failure enables you to review a failed test, the moment it fails. Alternatively, you may prefer testing to continue on failure and later you may review the report.

4.) Trackball to the **Start** button and press **Set**.

The Temperatures Test commences. While the test proceeds, the name of the test currently in progress (Temperatures) is displayed in the *Execute* field and the current *Loop #* and specific test are shown below. The messages *Init Done* and *Please Wait* are displayed beside the progress bar in the *Status* area.

As the testing sequence progresses, the progress bar will advance to reflect the test progress. Status indicators in the Data Flow map corresponding to the various system components will be highlighted in the appropriate color to indicate the current test status, as follows:

- **Green:** All recommended tests for these components have been completed and no problems were identified.
- **Red:** Problems were identified in these components during the performance of the test.
- **Yellow:** The tests executed so far on these components have passed, but not all recommended tests have been performed.

5.) At any stage, trackball to the **Pause** button and press **Set**, if required.

6.) To resume testing (from the point where you paused), trackball to the **Start** button and press **Set**.

When the Temperatures Test sequence is complete:

- the *Diagnostic Test* window displays the Finished message
- the View Test Log window opens automatically, listing all tests performed and showing details of which tests passed or failed, as shown in the example in Figure 7-66 "View Test Log - Temperatures Test" on page 7-97.

7-5-1 Accessing the Monitoring Diagnostic Test Options (cont'd)

Figure 7-66 View Test Log - Temperatures Test

NOTE: For this test, there is one report (Temperatures) which is listed in the Reports window on the right. By default, this report is displayed in the Reports window below.

7.) Check that the test passed and that result values are within the pre-defined *Max* and *Min* limits, as shown in Figure 7-66 "View Test Log - Temperatures Test" on page 7-97.

8) When done, trackball to the **Exit** button and press **Set** to close the View Report window.

9) After reviewing the test results, proceed as follows:

- If no problems were identified, it is recommended to re-boot the system (this is obligatory when prompted).
- If no problems were identified but the problem persists, contact your local GE HEALTHCARE field engineer for assistance.
- If errors were identified but the results were marginal, perform calibration, as described in "DC Offset Calibration" on page 7-24, and then repeat the test.
- If errors were identified and the results were not marginal, verify that all system cables and boards are connected (not misplaced) and functioning properly, as described in *Chapter 5 - Components and Function (Theory)*.

  If the problem persists, this indicates that either the specific board you tested is faulty or that another board that supports the operation of this board is faulty. Contact your local GE HEALTHCARE field engineer for assistance.

10.) Trackball to the **Exit** button and press **Set** to close the *View Test Log* dialog box.

11.) Press the <**Esc**> button on the keyboard to close the Diagnostic *Test Window*.

7-5-1 Accessing the Monitoring Diagnostic Test Options (cont'd)

7-5-1-4 Fans Speed Test

NOTE: For a description of this test, refer to the information in 7-2-4-3-4 "Fans Speed Test" on page 7-13.

NOTICE **IMPORTANT** In order to access an individual board test, it is necessary to insert the service dongle from system boot-up and enter the Service Password.

1.) In the *Diagnostic Test* window, trackball to **Fans Speed** in the list of *Monitoring* tests available for selection from the Diagnostic Test Tree (see Figure 7-67 "Fans Speed Test" on page 7-98) and press **Set**. The Fans Speed Test name is displayed under *Execute;* the relevant system components to be tested are highlighted light blue in the Schematic View (AC/DC, Battery, PS), as shown below:

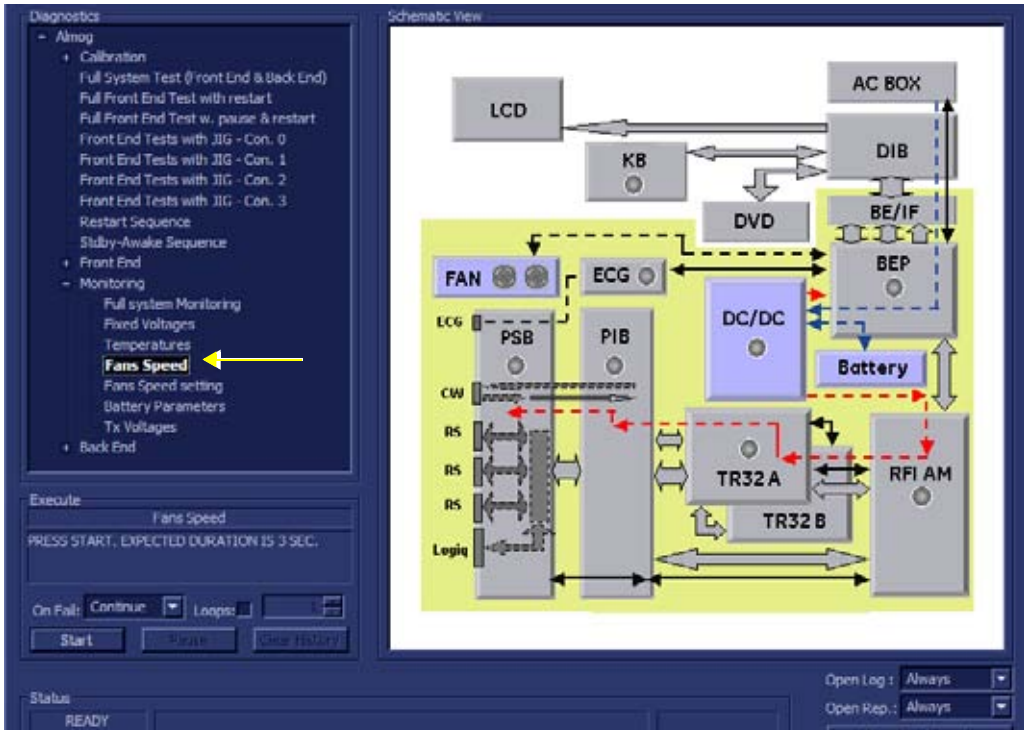

Figure 7-67 Fans Speed Test

2.) Under the *Special Instructions* area, activate the **Loops** checkbox and select the required number of *Loops* from the combo box.

3.) Adjacent to *On Fail,* select either **Stop** or **Continue**, as required. Stopping on failure enables you to review a failed test, the moment it fails. Alternatively, you may prefer testing to continue on failure and later you may review the report.

4.) Trackball to the **Start** button and press **Set**.

The Fans Speed Test commences. While the test proceeds, the name of the test currently in progress (Fans Speed) is displayed in the *Execute* field and the current *Loop* # and specific test are shown below. The messages *Init Done* and *Please Wait* are displayed beside the progress bar in the *Status* area.

As the testing sequence progresses, the progress bar will advance to reflect the test progress. Status indicators in the Data Flow map corresponding to the various system components will be highlighted in the appropriate color to indicate the current test status, as follows:

7-5-1 Accessing the Monitoring Diagnostic Test Options (cont'd)

- **Green:** All recommended tests for these components have been completed and no problems were identified.
- **Red:** Problems were identified in these components during the performance of the test.
- **Yellow:** The tests executed so far on these components have passed, but not all recommended tests have been performed.

5.) At any stage, trackball to the **Pause** button and press **Set**, if required.

6.) To resume testing (from the point where you paused), trackball to the **Start** button and press **Set**.

When the Fans Speed Test sequence is complete:

- the *Diagnostic Test* window displays the Finished message
- the View Test Log window opens automatically, listing all tests performed and showing details of which tests passed or failed, as shown in the example in Figure 7-68 "View Test Log - Fans Speed Test" on page 7-99.

Figure 7-68 View Test Log - Fans Speed Test

NOTE: For this test, there is one report (Fans Status) which is listed in the Reports window on the right. By default, this report is displayed in the Reports window below.

7.) Check that the test passed and that result values for each fan are within the pre-defined *Max* and *Min* limits, as shown in Figure 7-68 "View Test Log - Fans Speed Test" on page 7-99.

8) When done, trackball to the **Exit** button and press **Set** to close the View Report window.

9) After reviewing the test results, proceed as follows:

- If no problems were identified, it is recommended to re-boot the system (this is obligatory when prompted).
- If no problems were identified but the problem persists, contact your local GE HEALTHCARE field engineer for assistance.

7-5-1 Accessing the Monitoring Diagnostic Test Options (cont'd)

- If the test fails, repeat the Fan Speed Test.
- If errors were identified but the results were marginal, perform calibration, as described in "DC Offset Calibration" on page 7-24, and then repeat the test.
- If errors were identified and the results were not marginal, verify that all system cables and boards are connected (not misplaced) and functioning properly, as described in *Chapter 5 - Components and Function (Theory)*.

  If the problem persists, this indicates that either the specific board you tested is faulty or that another board that supports the operation of this board is faulty. Contact your local GE HEALTHCARE field engineer for assistance.

10.) Trackball to the **Exit** button and press **Set** to close the *View Test Log* dialog box.

11.) Press the <**Esc**> button on the keyboard to close the Diagnostic *Test Window*.

7-5-1-5 Fans Speed Setting Test

NOTE: For a description of this test, refer to the information in "Fans Speed Setting Test" on page 7-13.

NOTICE **IMPORTANT** In order to access an individual board test, it is necessary to insert the service dongle from system boot-up and enter the Service Password.

1.) In the *Diagnostic Test* window, trackball to **Fans Speed Setting** in the list of *Monitoring* tests available for selection from the Diagnostic Test Tree (see Figure 7-69 "Fans Speed Setting Test" on page 7-100) and press **Set**. The Fans Speed Test name is displayed under *Execute;* the relevant system components to be tested are highlighted light blue in the Schematic View (AC/DC, Battery, PS), as shown below:

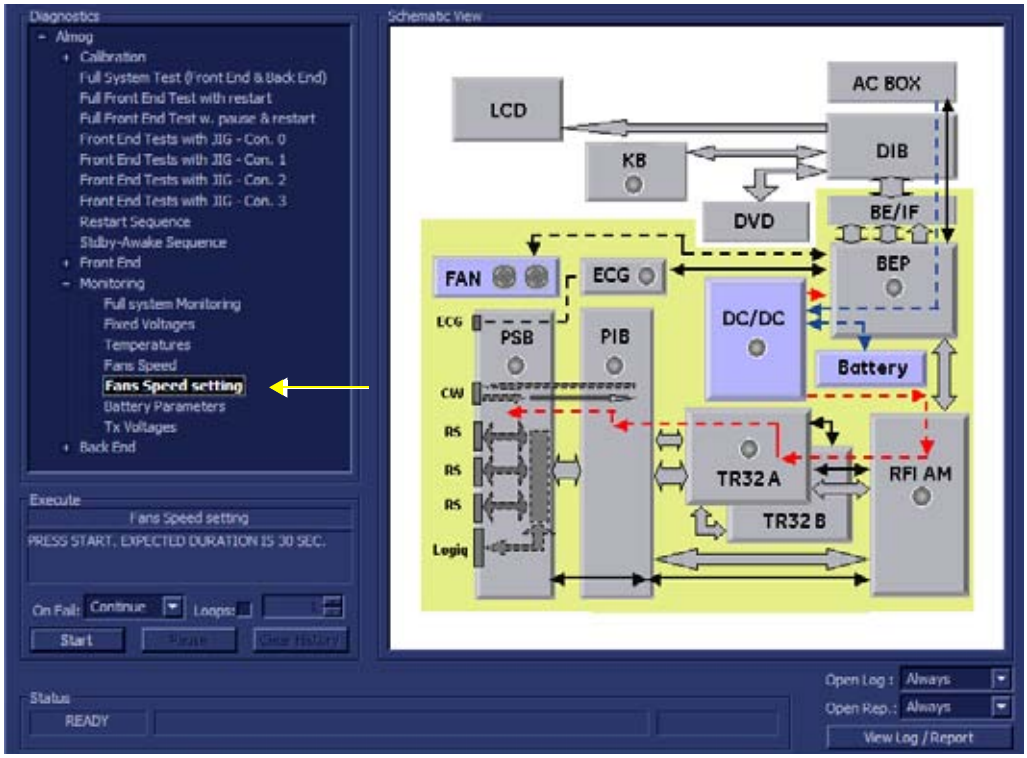

Figure 7-69 Fans Speed Setting Test

7-5-1 Accessing the Monitoring Diagnostic Test Options (cont'd)

2.) Under the *Special Instructions* area, activate the **Loops** checkbox and select the required number of *Loops* from the combo box.

3.) Adjacent to *On Fail,* select either **Stop** or **Continue**, as required. Stopping on failure enables you to review a failed test, the moment it fails. Alternatively, you may prefer testing to continue on failure and later you may review the report.

4.) Trackball to the **Start** button and press **Set**.

The Fans Speed Test commences. While the test proceeds, the name of the test currently in progress (Fans Speed) is displayed in the *Execute* field and the current *Loop #* and specific test are shown below. The messages *Init Done* and *Please Wait* are displayed beside the progress bar in the *Status* area.

As the testing sequence progresses, the progress bar will advance to reflect the test progress. Status indicators in the Data Flow map corresponding to the various system components will be highlighted in the appropriate color to indicate the current test status, as follows:

- **Green:** All recommended tests for these components have been completed and no problems were identified.
- **Red:** Problems were identified in these components during the performance of the test.
- **Yellow:** The tests executed so far on these components have passed, but not all recommended tests have been performed.

5.) At any stage, trackball to the **Pause** button and press **Set**, if required.

6.) To resume testing (from the point where you paused), trackball to the **Start** button and press **Set**.

When the Fans Speed Test sequence is complete:

- the *Diagnostic Test* window displays the Finished message
- the View Test Log window opens automatically, listing all tests performed and showing details of which tests passed or failed, as shown in the example in Figure 7-70 "View Test Log - Fans Speed Setting Test" on page 7-102.

7-5-1 Accessing the Monitoring Diagnostic Test Options (cont'd)

Figure 7-70 View Test Log - Fans Speed Setting Test

NOTE: For this test, there is one report (Fans Status) which is listed in the Reports window on the right. By default, this report is displayed in the Reports window below.

7.) Check that the test passed and that result values for each fan are within the pre-defined *Max* and *Min* limits, as shown in Figure 7-70 "View Test Log - Fans Speed Setting Test" on page 7-102.

8) When done, trackball to the **Exit** button and press **Set** to close the View Report window.

9) After reviewing the test results, proceed as follows:

- If no problems were identified, it is recommended to re-boot the system (this is obligatory when prompted).
- If no problems were identified but the problem persists, contact your local GE HEALTHCARE field engineer for assistance.
- If the test fails, repeat the Fan Speed Test.
- If errors were identified but the results were marginal, perform calibration, as described in "DC Offset Calibration" on page 7-24, and then repeat the test.
- If errors were identified and the results were not marginal, verify that all system cables and boards are connected (not misplaced) and functioning properly, as described in *Chapter 5 - Components and Function (Theory)*.

  If the problem persists, this indicates that either the specific board you tested is faulty or that another board that supports the operation of this board is faulty. Contact your local GE HEALTHCARE field engineer for assistance.

10.) Trackball to the **Exit** button and press **Set** to close the *View Test Log* dialog box.

11.) Press the <**Esc**> button on the keyboard to close the Diagnostic *Test Window*.

7-5-1 Accessing the Monitoring Diagnostic Test Options (cont'd)

7-5-1-6 Battery Parameters Test

NOTE: For a description of this test, refer to the information in "Battery Parameters Test" on page 7-14.

NOTICE **IMPORTANT** In order to access an individual board test, it is necessary to insert the service dongle from system boot-up and enter the Service Password.

1.) In the *Diagnostic Test* window, trackball to **Battery Parameters** in the list of *Monitoring* tests available for selection from the Diagnostic Test Tree (see Figure 7-71 "Battery Parameters Test" on page 7-103) and press **Set**. The Battery Parameters Test name is displayed under *Execute;* the relevant system components to be tested are highlighted light blue in the Schematic View (AC/DC, Battery, PS), as shown below:

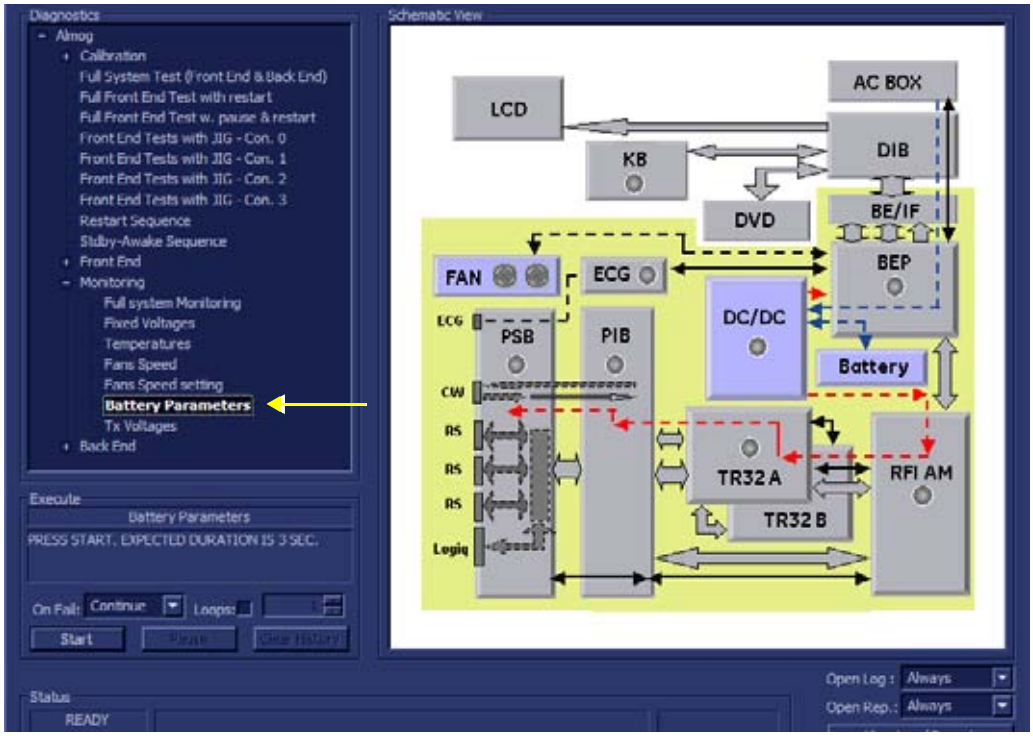

Figure 7-71 Battery Parameters Test

2.) Under the *Special Instructions* area, activate the **Loops** checkbox and select the required number of *Loops* from the combo box.

3.) Adjacent to *On Fail,* select either **Stop** or **Continue**, as required. Stopping on failure enables you to review a failed test, the moment it fails. Alternatively, you may prefer testing to continue on failure and later you may review the report.

4.) Trackball to the **Start** button and press **Set**.

The Battery Parameters Test commences. While the test proceeds, the name of the test currently in progress (Battery Parameters) is displayed in the *Execute* field and the current *Loop* # and specific test are shown below. The messages *Init Done* and *Please Wait* are displayed beside the progress bar in the *Status* area.

As the testing sequence progresses, the progress bar will advance to reflect the test progress. Status indicators in the Data Flow map corresponding to the various system components will be highlighted in the appropriate color to indicate the current test status, as follows:

7-5-1 Accessing the Monitoring Diagnostic Test Options (cont'd)

- **Green:** All recommended tests for these components have been completed and no problems were identified.
- **Red:** Problems were identified in these components during the performance of the test.
- **Yellow:** The tests executed so far on these components have passed, but not all recommended tests have been performed.

5.) At any stage, trackball to the **Pause** button and press **Set**, if required.

6.) To resume testing (from the point where you paused), trackball to the **Start** button and press **Set**.

When the Battery Parameters Test sequence is complete:

- the *Diagnostic Test* window displays the Finished message
- the View Test Log window opens automatically, listing all tests performed and showing details of which tests passed or failed, as shown in the example in Figure 7-72 "View Test Log - Battery Parameters Test" on page 7-104.

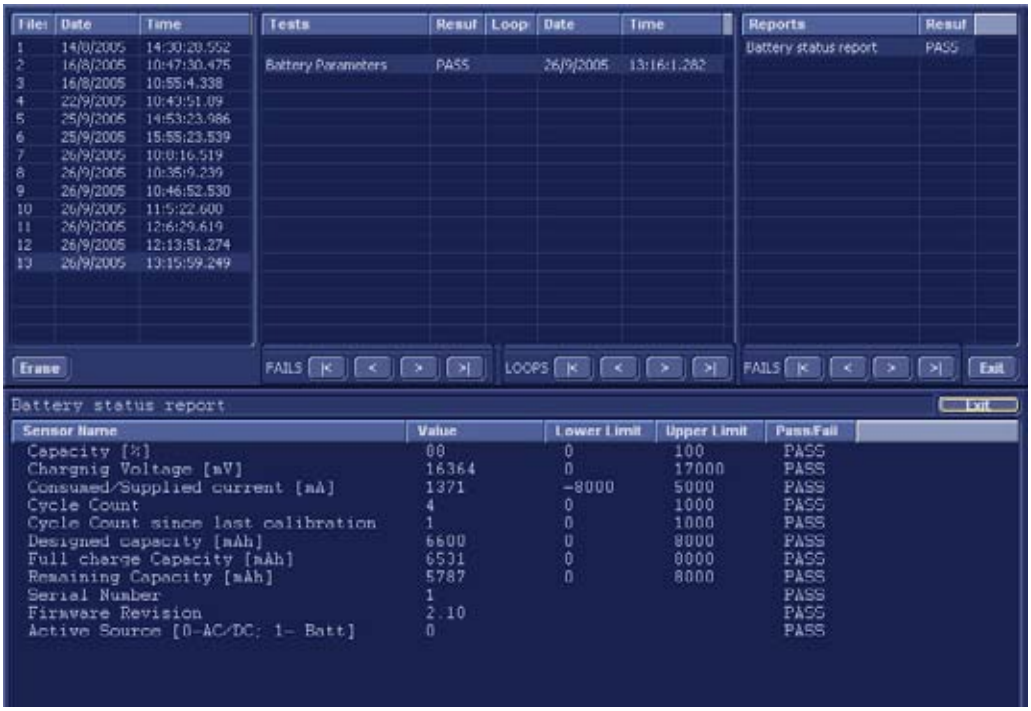
Tile: Date Time
Tests Result Loop Date Time
Battery Parameters PASS 26/9/2005 13:16:1.282
Reports Result
Battery status report PASS
Erase
FAILS
LOOPS
FAILS
Exit
Battery status report
Exit
Sensor Name Value Lower Limit Upper Limit Pass/Fail
Capacity [%] 00 0 100 PASS
Chargnig Voltage [mV] 16364 0 17000 PASS
Consumed/Supplied current [mA] 1371 -8000 5000 PASS
Cycle Count 4 0 1000 PASS
Cycle Count since last calibration 1 0 1000 PASS
Designed capacity [mAh] 6600 0 8000 PASS
Full charge Capacity [mAh] 6531 0 8000 PASS
Remaining Capacity [mAh] 5787 0 8000 PASS
Serial Number 1 PASS
Firmware Revision 2.10 PASS
Active Source [0-AC/DC; 1- Batt] 0 PASS

Figure 7-72 View Test Log - Battery Parameters Test

NOTE: For this test, there is one report (Battery Status) which is listed in the Reports window on the right. By default, this report is displayed in the Reports window below.

7.) Check that the test passed and that result values for each sensor are within the pre-defined *Lower* and *Upper* limits, as shown in Figure 7-72 "View Test Log - Battery Parameters Test" on page 7-104.

8) When done, trackball to the **Exit** button and press **Set** to close the View Report window.

9) After reviewing the test results, proceed as follows:

- If no problems were identified, it is recommended to re-boot the system (this is obligatory when prompted).
- If no problems were identified but the problem persists, contact your local GE HEALTHCARE field engineer for assistance.

7-5-1 Accessing the Monitoring Diagnostic Test Options (cont'd)

- If errors were identified but the results were marginal, perform calibration, as described in "DC Offset Calibration" on page 7-24, and then repeat the test.
- If errors were identified and the results were not marginal, verify that all system cables and boards are connected (not misplaced) and functioning properly, as described in *Chapter 5 - Components and Function (Theory)*.

  If the problem persists, this indicates that either the specific board you tested is faulty or that another board that supports the operation of this board is faulty. Contact your local GE HEALTHCARE field engineer for assistance.

10.) Trackball to the **Exit** button and press **Set** to close the *View Test Log* dialog box.

11.) Press the <**Esc**> button on the keyboard to close the Diagnostic *Test Window*.

7-5-1-7 Tx Voltages Test

NOTE: For a description of this test, refer to the information in "Tx Voltages Test" on page 7-14.

NOTICE **IMPORTANT** In order to access an individual board test, it is necessary to insert the service dongle from system boot-up and enter the Service Password.

1.) In the *Diagnostic Test* window, trackball to **Tx Voltages** in the list of *Monitoring* tests available for selection from the Diagnostic Test Tree (see Figure 7-73 "Tx Voltages Test" on page 7-105) and press **Set**. The Tx Voltages Test name is displayed under *Execute;* the relevant system components to be tested are highlighted light blue in the Schematic View (AC/DC, Battery, PS), as shown below:

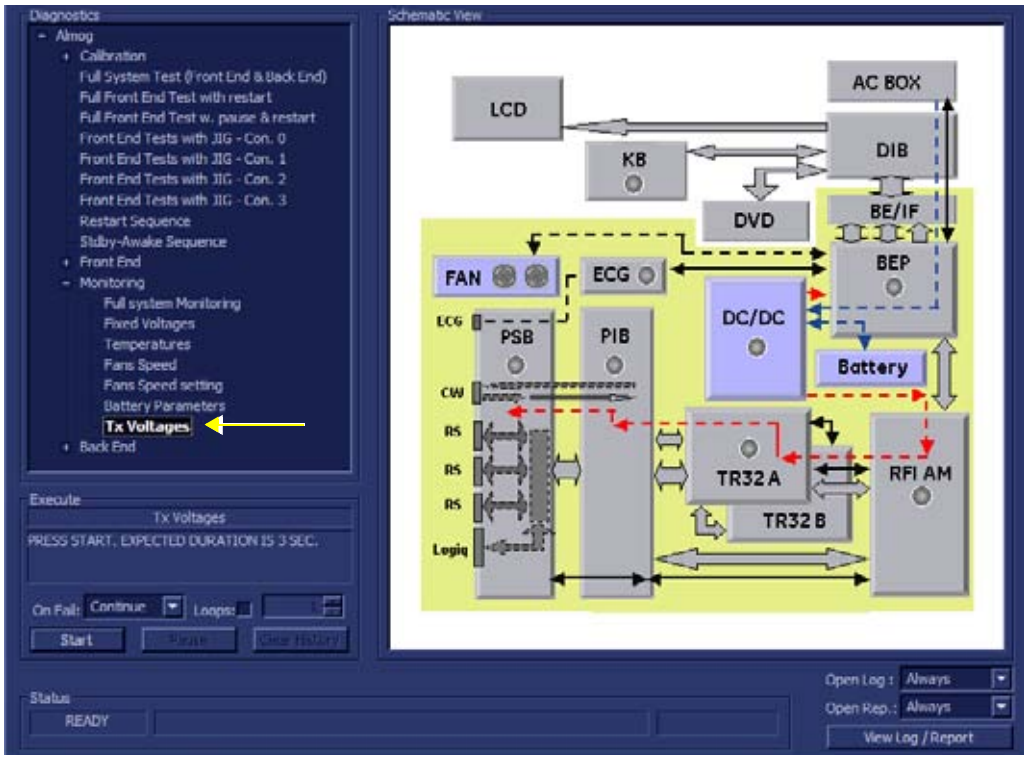

Figure 7-73 Tx Voltages Test

2.) Under the *Special Instructions* area, activate the **Loops** checkbox and select the required number of *Loops* from the combo box.

7-5-1 Accessing the Monitoring Diagnostic Test Options (cont'd)

3.) Adjacent to *On Fail,* select either **Stop** or **Continue**, as required. Stopping on failure enables you to review a failed test, the moment it fails. Alternatively, you may prefer testing to continue on failure and later you may review the report.

4.) Trackball to the **Start** button and press **Set**.

The Tx Voltages Test commences. While the test proceeds, the name of the test currently in progress (Tx Voltages) is displayed in the *Execute* field and the current *Loop #* and specific test are shown below. The messages *Init Done* and *Please Wait* are displayed beside the progress bar in the *Status* area.

As the testing sequence progresses, the progress bar will advance to reflect the test progress. Status indicators in the Data Flow map corresponding to the various system components will be highlighted in the appropriate color to indicate the current test status, as follows:

- **Green:** All recommended tests for these components have been completed and no problems were identified.
- **Red:** Problems were identified in these components during the performance of the test.
- **Yellow:** The tests executed so far on these components have passed, but not all recommended tests have been performed.

5.) At any stage, trackball to the **Pause** button and press **Set**, if required.

6.) To resume testing (from the point where you paused), trackball to the **Start** button and press **Set**.

When the Tx Voltages Test sequence is complete:

- the *Diagnostic Test* window displays the Finished message
- the View Test Log window opens automatically, listing all tests performed and showing details of which tests passed or failed, as shown in the example in Figure 7-74 "View Test Log - Tx Voltages Test" on page 7-106.

Figure 7-74 View Test Log - Tx Voltages Test

7-5-1 Accessing the Monitoring Diagnostic Test Options (cont'd)

NOTE: For this test, there is one report (Tx Voltages) which is listed in the Reports window on the right. By default, this report is displayed in the Reports window below.

7.) Check that the test passed and that result values for each fan are within the pre-defined *Max* and *Min* voltage limits, as shown in Figure 7-74 "View Test Log - Tx Voltages Test" on page 7-106.

8) When done, trackball to the **Exit** button and press **Set** to close the View Report window.

9) After reviewing the test results, proceed as follows:

- If no problems were identified, it is recommended to re-boot the system (this is obligatory when prompted).
- If no problems were identified but the problem persists, contact your local GE HEALTHCARE field engineer for assistance.
- If errors were identified but the results were marginal, perform calibration, as described in "DC Offset Calibration" on page 7-24, and then repeat the test.
- If errors were identified and the results were not marginal, verify that all system cables and boards are connected (not misplaced) and functioning properly, as described in *Chapter 5 - Components and Function (Theory)*.

  If the problem persists, this indicates that either the specific board you tested is faulty or that another board that supports the operation of this board is faulty. Contact your local GE HEALTHCARE field engineer for assistance.

10.) Trackball to the **Exit** button and press **Set** to close the *View Test Log* dialog box.

11.) Press the <**Esc**> button on the keyboard to close the Diagnostic *Test Window*.

Section 7-6
Performing Back End Diagnostics on the System

The Back End Diagnostics Tests enable you to test the functionality of various Back End hardware components.

NOTE: The Back End Diagnostic Tests may be performed independently, regardless of sequence.

7-6-1 Accessing the Back End Diagnostic Test Options

- Access the *Diagnostic Test* window, as described in the 7-4-1 "Accessing the Front End Diagnostic Options" on page 7-24.

7-6-1 Accessing the Back End Diagnostic Test Options (cont'd)

7-6-1-1 PC Doctor

NOTE: For a complete description of all PC Doctor tests, refer to the information in 7-2-4-4-1 "PC Doctor" on page 7-15.

This procedures in this section are divided into two groups. Refer to the relevant procedure, as follows:

- **Automatic Tests**
  - 7-6-1-1-1 "Full Back End Test w/o Hard Disk Scan" on page 7-109 - see below
  - 7-6-1-1-2 "Full PC Doctor Test (50 min)" on page 7-112
  - 7-6-1-1-3 "CPU Tests" on page 7-114
  - 7-6-1-1-4 "HD Test" on page 7-117
  - 7-6-1-1-5 "Memory Test" on page 7-119
  - 7-6-1-1-6 "Video Test" on page 7-121
  - 7-6-1-1-7 "PCI Test" on page 7-123
  - 7-6-1-1-8 "Network Test" on page 7-125

7-6-1-1-1 Full Back End Test w/o Hard Disk Scan

NOTE: For a description of this test, refer to - "Full Back End Test without Hard Disk" on page 7-15.

1.) In the *Diagnostic Test* window, trackball to **Full Back End Test w/o Hard Disk Scan** in the list of *PC Doctor* tests available for selection from the Diagnostic Test Tree (see Figure 7-75 "Full Back End Test w/o Hard Disk Scan" on page 7-110) and press **Set**. The Test name is displayed under *Execute;* the relevant system components to be tested are highlighted light blue in the Schematic View (BEP, Peripherals, Keyboard) , as shown below:

7-6-1 Accessing the Back End Diagnostic Test Options (cont'd)

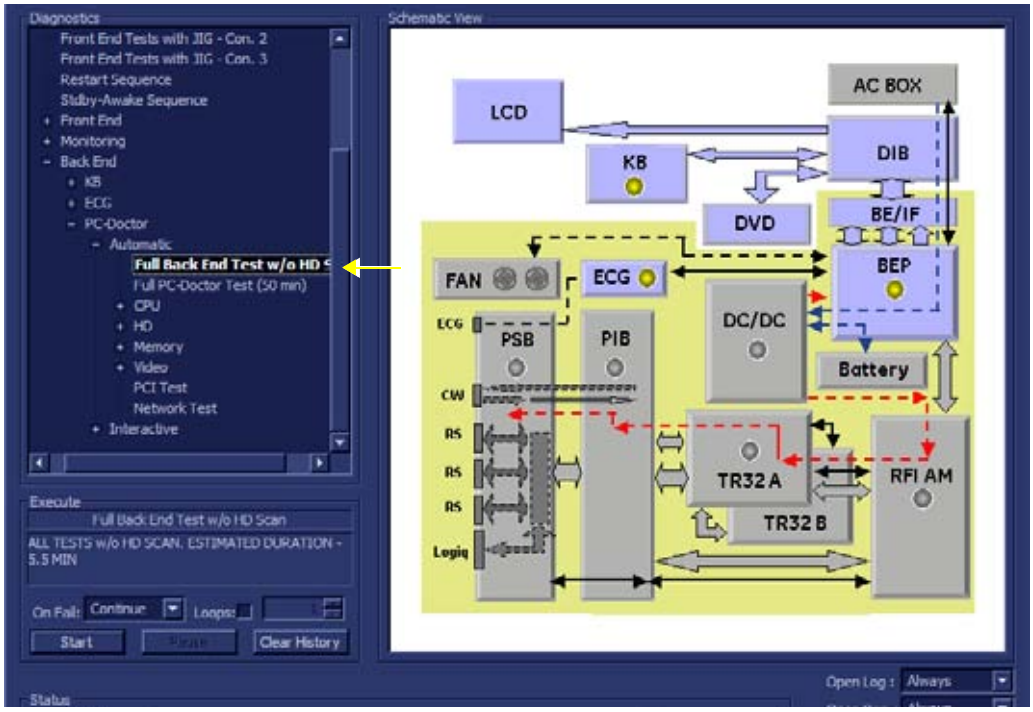

Figure 7-75 Full Back End Test w/o Hard Disk Scan

2.) Under the *Special Instructions* area, activate the **Loops** checkbox and select the required number of *Loops* from the combo box.

3.) Adjacent to *On Fail,* select either **Stop** or **Continue**, as required. Stopping on failure enables you to review a failed test, the moment it fails. Alternatively, you may prefer testing to continue on failure and later you may review the report.

4.) Trackball to the **Start** button and press **Set**.

The Full Back End Test w/o Hard Disk Scan commences. While the test proceeds, the name of the test currently in progress is displayed in the *Execute* field and the current *Loop #* and specific test are shown below. The messages *Init Done* and *Please Wait* are displayed beside the progress bar in the *Status* area.

As the testing sequence progresses, the progress bar will advance to reflect the test progress. Status indicators in the Data Flow map corresponding to the various system components will be highlighted in the appropriate color to indicate the current test status, as follows:

- **Green:** All recommended tests for these components have been completed and no problems were identified.
- **Red:** Problems were identified in these components during the performance of the test.
- **Yellow:** The tests executed so far on these components have passed, but not all recommended tests have been performed.

5.) At any stage, trackball to the **Pause** button and press **Set**, if required.

6.) To resume testing (from the point where you paused), trackball to the **Start** button and press **Set**.

When the Full Back End Test w/o Hard Disk Scan sequence is complete:

- the *Diagnostic Test* window displays the Finished message
- the View Test Log window opens automatically, listing all tests performed and showing details of which tests and sub-tests passed or failed, as shown in the example in Figure 7-76 "View Test Log - Full Back End Test w/o Hard Disk Scan" on page 7-111

7-6-1 Accessing the Back End Diagnostic Test Options (cont'd)

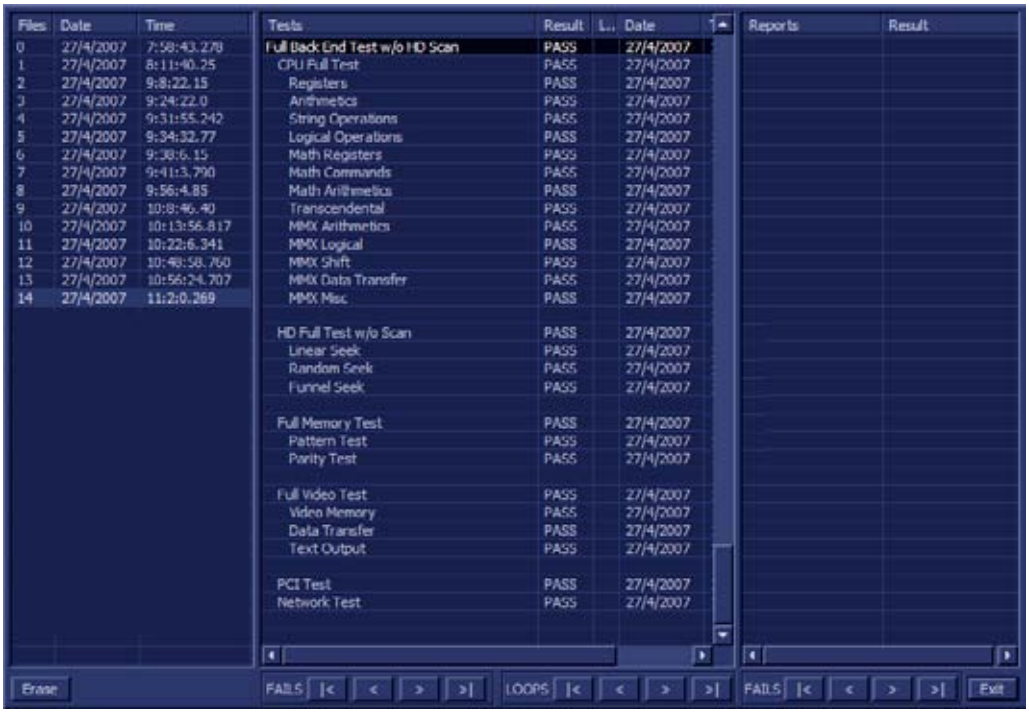

Figure 7-76 View Test Log - Full Back End Test w/o Hard Disk Scan

NOTE: For the Full Back End Test w/o Hard Disk Scan, many tests are performed in the test sequence; these are listed in the Tests window as shown in Figure 7-76 "View Test Log - Full Back End Test w/o Hard Disk Scan" on page 7-111. For each currently-selected test (for example, CPU Full Test) the corresponding report is listed in Reports on the right.
For details of each report, refer to the explanations provided in "CPU Tests" on page 7-114:

7.) Use the scroll bars and/or arrows to scroll through the list of *Test* results and review the reports, as required.

8) When done, trackball to the **Exit** button and press **Set** to close the View Report window.

9) After reviewing the test results, proceed as follows:

- If no problems were identified, it is recommended to re-boot the system (this is obligatory when prompted).
- If no problems were identified but the problem persists, contact your local GE HEALTHCARE field engineer for assistance.
- If errors were identified and the results were not marginal, verify that all system cables and boards are connected (not misplaced) and functioning properly, as described in *Chapter 5 - Components and Function (Theory)*.

  If the problem persists, this indicates that either the specific board you tested is faulty or that another board that supports the operation of this board is faulty. Contact your local GE HEALTHCARE field engineer for assistance.

10.) Trackball to the **Exit** button and press **Set** to close the *View Test Log* dialog box.

11.) Press the <**Esc**> button on the keyboard to close the Diagnostic *Test Window*.

7-6-1 Accessing the Back End Diagnostic Test Options (cont'd)

7-6-1-1-2 Full PC Doctor Test (50 min)

NOTE: For a description of this test, refer to the information in - "Full PC Doctor Test (50 min)" on page 7-15.

1.) In the *Diagnostic Test* window, trackball to **Full PC Doctor Test** in the list of *PC Doctor* tests available for selection from the Diagnostic Test Tree (see Figure 7-77 "Full PC Doctor Test" on page 7-112) and press **Set**. The Test name is displayed under *Execute;* the relevant system components to be tested are highlighted light blue in the Schematic View (BEP, Peripherals, Keyboard) , as shown below:

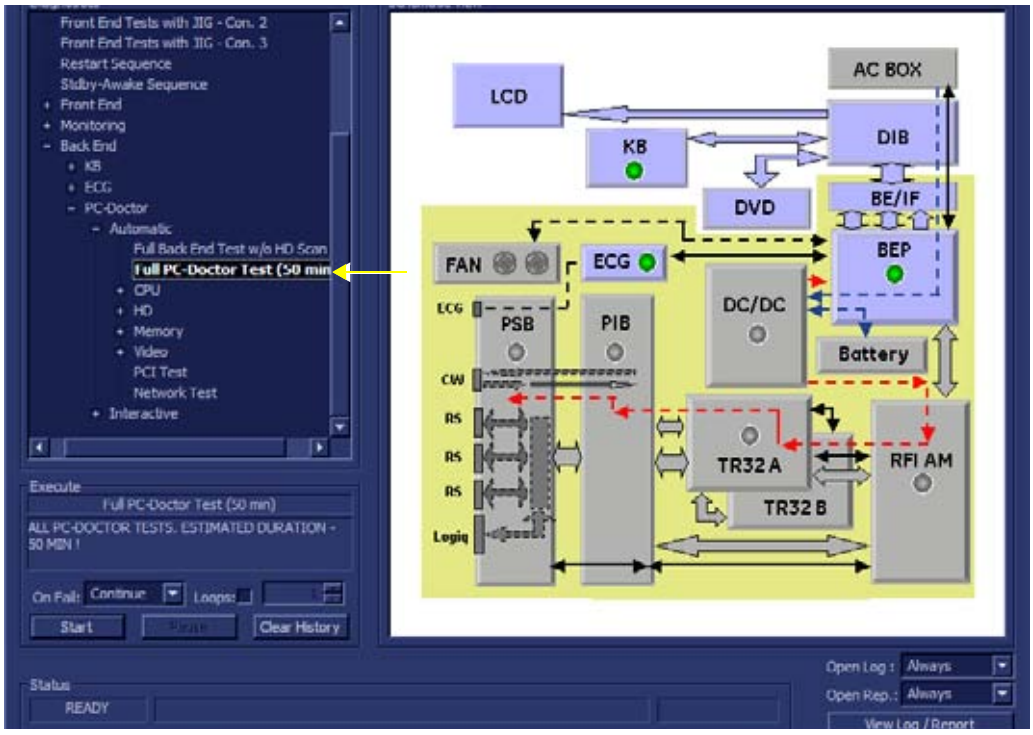

Figure 7-77 Full PC Doctor Test

2.) Under the *Special Instructions* area, activate the **Loops** checkbox and select the required number of *Loops* from the combo box.

3.) Adjacent to *On Fail,* select either **Stop** or **Continue**, as required. Stopping on failure enables you to review a failed test, the moment it fails. Alternatively, you may prefer testing to continue on failure and later you may review the report.

4.) Trackball to the **Start** button and press **Set**.

The Full PC Doctor Test commences. While the test proceeds, the name of the test currently in progress is displayed in the *Execute* field and the current *Loop #* and specific test are shown below. The messages *Init Done* and *Please Wait* are displayed beside the progress bar in the *Status* area.

As the testing sequence progresses, the progress bar will advance to reflect the test progress. Status indicators in the Data Flow map corresponding to the various system components will be highlighted in the appropriate color to indicate the current test status, as follows:

- **Green:** All recommended tests for these components have been completed and no problems were identified.
- **Red:** Problems were identified in these components during the performance of the test.
- **Yellow:** The tests executed so far on these components have passed, but not all recommended tests have been performed.

7-6-1 Accessing the Back End Diagnostic Test Options (cont'd)

5.) At any stage, trackball to the **Pause** button and press **Set**, if required.

6.) To resume testing (from the point where you paused), trackball to the **Start** button and press **Set**.

When the Full PC Doctor Test sequence is complete:

- the *Diagnostic Test* window displays the Finished message
- the View Test Log window opens automatically, listing all tests performed and showing details of which tests and sub-tests passed or failed, as shown in the example in Figure 7-76 "View Test Log - Full Back End Test w/o Hard Disk Scan" on page 7-111.

Figure 7-78 View Test Log - Full PC Doctor Test

NOTE: For the Full PC Doctor Test, many tests are performed in the test sequence; these are listed in the Tests window as shown in Figure 7-78 "View Test Log - Full PC Doctor Test" on page 7-113. For each currently-selected test (for example, CPU Full Test) the corresponding report is listed in Reports on the right.
For details of each report, refer to the explanations provided in 7-6-1-1-3 "CPU Tests" on page 7-114:

7.) Use the scroll bars and/or arrows to scroll through the list of *Test* results and review the reports, as required.

8) When done, trackball to the **Exit** button and press **Set** to close the View Report window.

9) After reviewing the test results, proceed as follows:

- If no problems were identified, it is recommended to re-boot the system (this is obligatory when prompted).
- If no problems were identified but the problem persists, contact your local GE HEALTHCARE field engineer for assistance.
- If errors were identified and the results were not marginal, verify that all system cables and boards are connected (not misplaced) and functioning properly, as described in *Chapter 5 - Components and Function (Theory)*.

  If the problem persists, this indicates that either the specific board you tested is faulty or that another board that supports the operation of this board is faulty. Contact your local GE HEALTHCARE field engineer for assistance.

10.) Trackball to the **Exit** button and press **Set** to close the *View Test Log* dialog box.

11.) Press the <**Esc**> button on the keyboard to close the Diagnostic *Test Window*.

7-6-1 Accessing the Back End Diagnostic Test Options (cont'd)

7-6-1-1-3 CPU Tests

NOTE: For a description of these tests, refer to the information in - "CPU Tests" on page 7-15.

1.) In the *Diagnostic Test* window, trackball to **CPU Full Test** in the list of *CPU* tests available for selection from the Diagnostic Test Tree (see Figure 7-79 "CPU Full Test" on page 7-114) and press **Set**. The Test name is displayed under *Execute;* the relevant system components to be tested are highlighted light blue in the Schematic View (BEP, Peripherals, Keyboard) , as shown below:

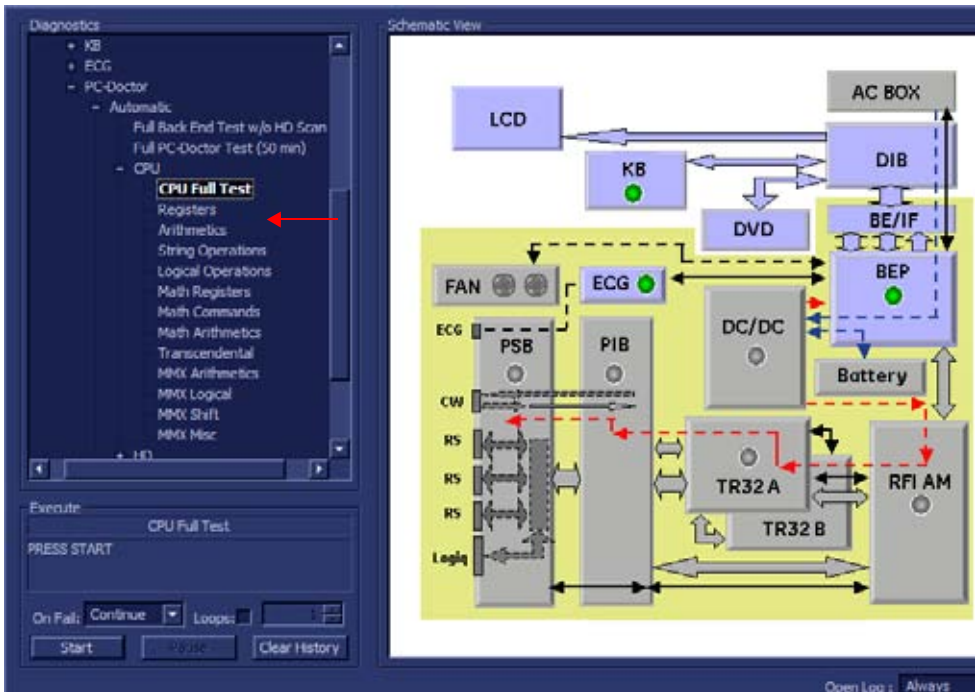

Figure 7-79 CPU Full Test

2.) Under the *Special Instructions* area, activate the **Loops** checkbox and select the required number of *Loops* from the combo box.

3.) Adjacent to *On Fail,* select either **Stop** or **Continue**, as required. Stopping on failure enables you to review a failed test, the moment it fails. Alternatively, you may prefer testing to continue on failure and later you may review the report.

4.) Trackball to the **Start** button and press **Set**.

The CPU Full Test commences. While the test proceeds, the name of the test currently in progress is displayed in the *Execute* field and the current *Loop #* and specific test are shown below. The messages *Init Done* and *Please Wait* are displayed beside the progress bar in the *Status* area.

As the testing sequence progresses, the progress bar will advance to reflect the test progress. Status indicators in the Data Flow map corresponding to the various system components will be highlighted in the appropriate color to indicate the current test status, as follows:

- **Green:** All recommended tests for these components have been completed and no problems were identified.
- **Red:** Problems were identified in these components during the performance of the test.
- **Yellow:** The tests executed so far on these components have passed, but not all recommended tests have been performed.

5.) At any stage, trackball to the **Pause** button and press **Set**, if required.

7-6-1 Accessing the Back End Diagnostic Test Options (cont'd)

6.) To resume testing (from the point where you paused), trackball to the **Start** button and press **Set**.

When the CPU Full Test sequence is complete:

- the *Diagnostic Test* window displays the Finished message
- the View Test Log window opens automatically, listing all tests performed and showing details of which tests and sub-tests passed or failed, as shown in the example in Figure 7-76 "View Test Log - Full Back End Test w/o Hard Disk Scan" on page 7-111.

Figure 7-80 View Test Log - CPU Full Test

NOTE: For the CPU Full Test, many tests are performed in the test sequence; these are listed in the Tests window as shown in Figure 7-78. For each currently-selected test (for example, Registers) the corresponding report is listed in Reports on the right.

7.) Use the scroll bars and/or arrows to scroll through the list of *Test* results and review the reports, as required:

- CPU Registers
- CPU Arithmetics
- CPU String Operations
- CPU Logical Operations
- CPU Math Registers
- CPU Math Commands
- CPU Transcendental
- CPU MMX Arithmetic
- CPU MMX Logical
- CPU MMX Shift
- CPU MMX Data Transfer
- CPU MMX Misc.

8) When done, trackball to the **Exit** button and press **Set** to close the View Report window.

9) After reviewing the test results, proceed as follows:

- If no problems were identified, it is recommended to re-boot the system (this is obligatory when prompted).
- If no problems were identified but the problem persists, contact your local GE HEALTHCARE field engineer for assistance.
- If errors were identified and the results were not marginal, verify that all system cables and boards are connected (not misplaced) and functioning properly, as described in *Chapter 5 - Components and Function (Theory)*.

7-6-1 Accessing the Back End Diagnostic Test Options (cont'd)

If the problem persists, this indicates that either the specific board you tested is faulty or that another board that supports the operation of this board is faulty. Contact your local GE HEALTHCARE field engineer for assistance.

10.) Trackball to the **Exit** button and press **Set** to close the *View Test Log* dialog box.

11.) Press the <**Esc**> button on the keyboard to close the Diagnostic *Test Window*.

7-6-1 Accessing the Back End Diagnostic Test Options (cont'd)

7-6-1-1-4 HD Test

NOTE: For a description of these tests, refer to the information in - "HD Test" on page 7-16.

1.) In the *Diagnostic Test* window, trackball to **Hard Drive Full Test w/o Scan** in the list of *HD* tests available for selection from the Diagnostic Test Tree (see Figure 7-81 "Hard Drive Full Test w/o Scan" on page 7-117) and press **Set**. The Test name is displayed under *Execute;* the relevant system components to be tested are highlighted light blue in the Schematic View (BEP, Peripherals, Keyboard) , as shown below:

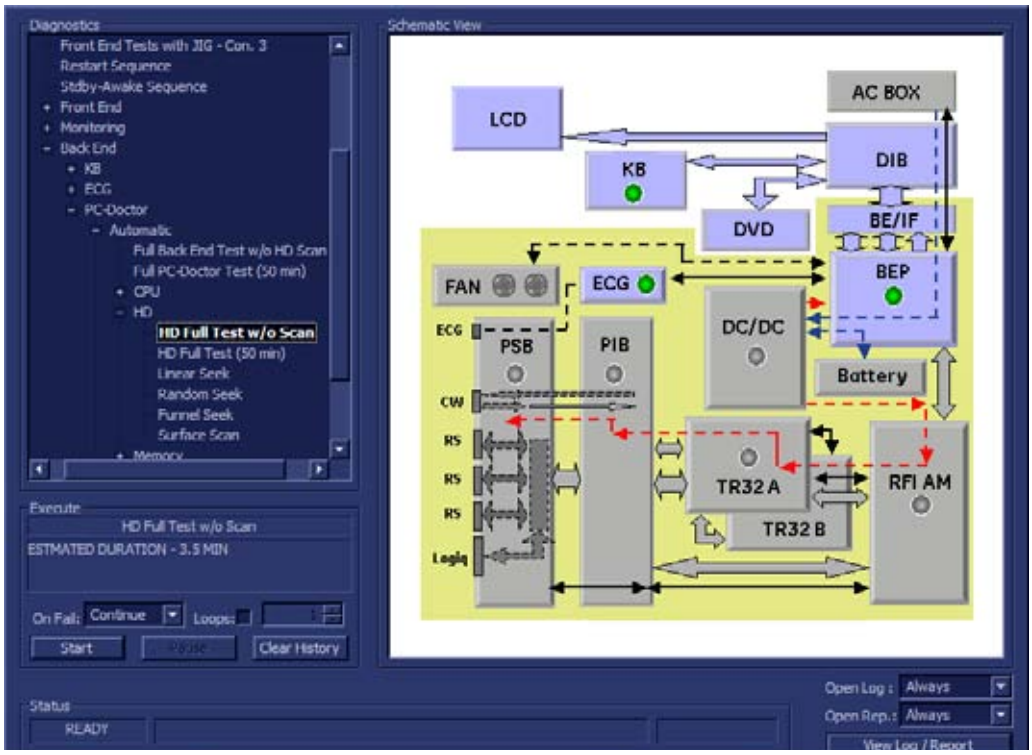

Figure 7-81 Hard Drive Full Test w/o Scan

2.) Under the *Special Instructions* area, activate the **Loops** checkbox and select the required number of *Loops* from the combo box.

3.) Adjacent to *On Fail,* select either **Stop** or **Continue**, as required. Stopping on failure enables you to review a failed test, the moment it fails. Alternatively, you may prefer testing to continue on failure and later you may review the report.

4.) Trackball to the **Start** button and press **Set**.

The Hard Drive Full Test w/o Scan commences. While the test proceeds, the name of the test currently in progress is displayed in the *Execute* field and the current *Loop* # and specific test are shown below. The messages *Init Done* and *Please Wait* are displayed beside the progress bar in the *Status* area.

As the testing sequence progresses, the progress bar will advance to reflect the test progress. Status indicators in the Data Flow map corresponding to the various system components will be highlighted in the appropriate color to indicate the current test status, as follows:

- **Green:** All recommended tests for these components have been completed and no problems were identified.
- **Red:** Problems were identified in these components during the performance of the test.

7-6-1 Accessing the Back End Diagnostic Test Options (cont'd)

- **Yellow:** The tests executed so far on these components have passed, but not all recommended tests have been performed.

5.) At any stage, trackball to the **Pause** button and press **Set**, if required.

6.) To resume testing (from the point where you paused), trackball to the **Start** button and press **Set**.

When the Hard Drive Full Test w/o Scan sequence is complete:

- the *Diagnostic Test* window displays the Finished message
- the View Test Log window opens automatically, listing all tests performed and showing details of which tests and sub-tests passed or failed, as shown in the example in Figure 7-82 "View Test Log - Hard Drive Full Test w/o Scan" on page 7-118.

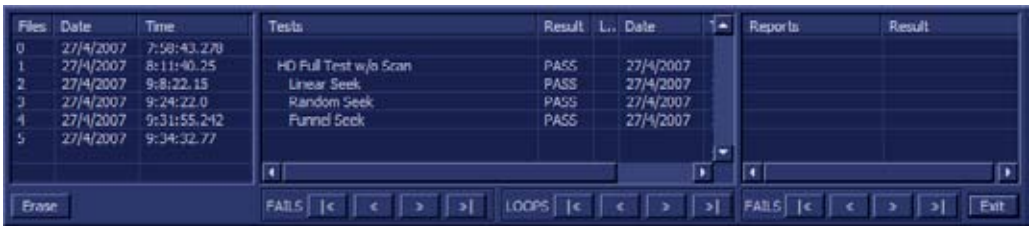

Figure 7-82 View Test Log - Hard Drive Full Test w/o Scan

NOTE: For the Hard Drive Full Test w/o Scan, several tests are performed in the test sequence; these are listed in the Tests window as shown in Figure 7-82 "View Test Log - Hard Drive Full Test w/o Scan" on page 7-118. For each currently-selected test (for example, Linear Seek) the corresponding report is listed in Reports on the right.

7.) Use the scroll bars and/or arrows to scroll through the list of *Test* results and review the reports, as required:

- Linear Seek
- Random Seek
- Funnel Scan

8) When done, trackball to the **Exit** button and press **Set** to close the View Report window.

9) After reviewing the test results, proceed as follows:

- If no problems were identified, it is recommended to re-boot the system (this is obligatory when prompted).
- If no problems were identified but the problem persists, contact your local GE HEALTHCARE field engineer for assistance.
- If errors were identified and the results were not marginal, verify that all system cables and boards are connected (not misplaced) and functioning properly, as described in *Chapter 5 - Components and Function (Theory)*.

  If the problem persists, this indicates that either the specific board you tested is faulty or that another board that supports the operation of this board is faulty. Contact your local GE HEALTHCARE field engineer for assistance.

10.) Trackball to the **Exit** button and press **Set** to close the *View Test Log* dialog box.

11.) Press the <**Esc**> button on the keyboard to close the Diagnostic *Test Window*.

7-6-1 Accessing the Back End Diagnostic Test Options (cont'd)

7-6-1-1-5 Memory Test

NOTE: For a description of these tests, refer to the information in - "Memory Test" on page 7-16.

1.) In the *Diagnostic Test* window, trackball to **Full Memory Test** in the list of *Memory* tests available for selection from the Diagnostic Test Tree (see Figure 7-83 "Full Memory Test" on page 7-119) and press **Set**. The Test name is displayed under *Execute;* the relevant system components to be tested are highlighted light blue in the Schematic View (BEP, Peripherals, Keyboard), as shown below:

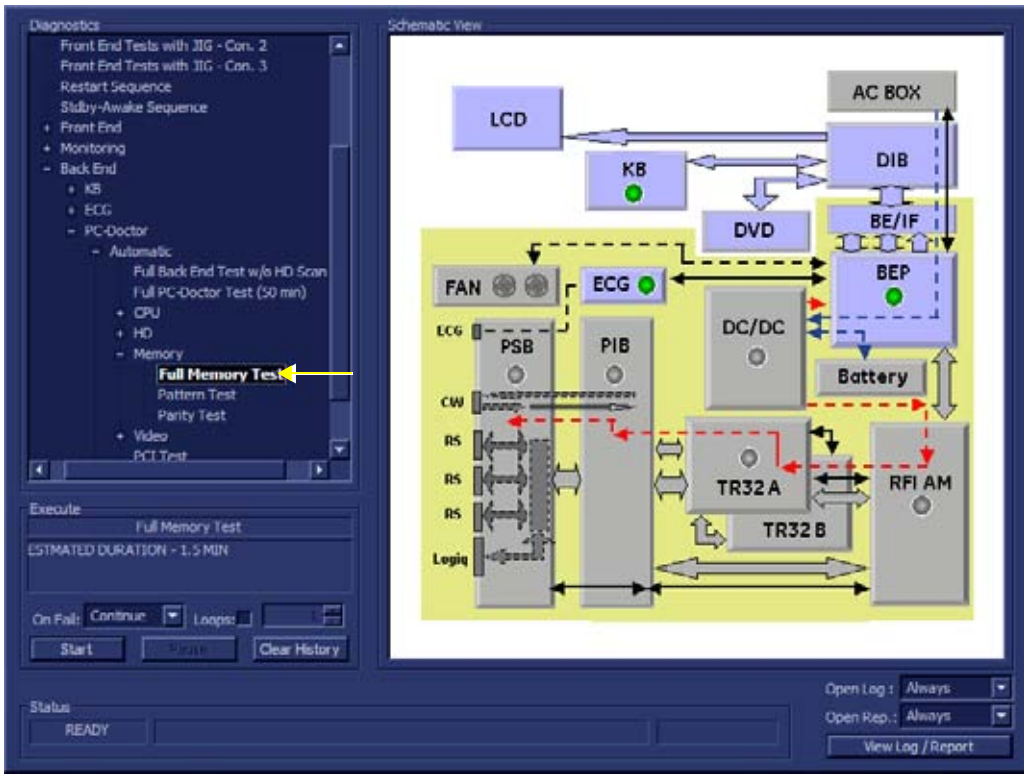

Figure 7-83 Full Memory Test

2.) Under the *Special Instructions* area, activate the **Loops** checkbox and select the required number of *Loops* from the combo box.

3.) Adjacent to *On Fail,* select either **Stop** or **Continue**, as required. Stopping on failure enables you to review a failed test, the moment it fails. Alternatively, you may prefer testing to continue on failure and later you may review the report.

4.) Trackball to the **Start** button and press **Set**.

The Full Memory Test commences. While the test proceeds, the name of the test currently in progress is displayed in the *Execute* field and the current *Loop #* and specific test are shown below. The messages *Init Done* and *Please Wait* are displayed beside the progress bar in the *Status* area.

As the testing sequence progresses, the progress bar will advance to reflect the test progress. Status indicators in the Data Flow map corresponding to the various system components will be highlighted in the appropriate color to indicate the current test status, as follows:

- **Green:** All recommended tests for these components have been completed and no problems were identified.
- **Red:** Problems were identified in these components during the performance of the test.

7-6-1 Accessing the Back End Diagnostic Test Options (cont'd)

- **Yellow:** The tests executed so far on these components have passed, but not all recommended tests have been performed.

5.) At any stage, trackball to the **Pause** button and press **Set**, if required.

6.) To resume testing (from the point where you paused), trackball to the **Start** button and press **Set**.

When the Full Memory Test sequence is complete:

- the *Diagnostic Test* window displays the Finished message
- the View Test Log window opens automatically, listing all tests performed and showing details of which tests and sub-tests passed or failed, as shown in the example in Figure 7-84 "View Test Log - Full Memory Test" on page 7-120.

Figure 7-84 View Test Log - Full Memory Test

NOTE: For the Full Memory Test, several tests are performed in the test sequence; these are listed in the Tests window as shown in Figure 7-84 "View Test Log - Full Memory Test" on page 7-120. For each currently-selected test (for example, Memory Pattern Test) the corresponding report is listed in Reports on the right.

7.) Use the scroll bars and/or arrows to scroll through the list of *Test* results and review the reports, as required:

- Memory Pattern Test
- Memory Parity Test

8) When done, trackball to the **Exit** button and press **Set** to close the View Report window.

9) After reviewing the test results, proceed as follows:

- If no problems were identified, it is recommended to re-boot the system (this is obligatory when prompted).
- If no problems were identified but the problem persists, contact your local GE HEALTHCARE field engineer for assistance.
- If errors were identified and the results were not marginal, verify that all system cables and boards are connected (not misplaced) and functioning properly, as described in *Chapter 5 - Components and Function (Theory)*.

  If the problem persists, this indicates that either the specific board you tested is faulty or that another board that supports the operation of this board is faulty. Contact your local GE HEALTHCARE field engineer for assistance.

10.) Trackball to the **Exit** button and press **Set** to close the *View Test Log* dialog box.

11.) Press the <**Esc**> button on the keyboard to close the Diagnostic *Test Window*.

7-6-1 Accessing the Back End Diagnostic Test Options (cont'd)

7-6-1-1-6 Video Test

NOTE: For a description of these tests, refer to the information in - "Video Test" on page 7-16.

1.) In the *Diagnostic Test* window, trackball to **Full Video Test** in the list of *Video* tests available for selection from the Diagnostic Test Tree (see Figure 7-83 "Full Memory Test" on page 7-119) and press **Set**. The Test name is displayed under *Execute;* the relevant system components to be tested are highlighted light blue in the Schematic View (BEP, Peripherals, Keyboard), as shown below:

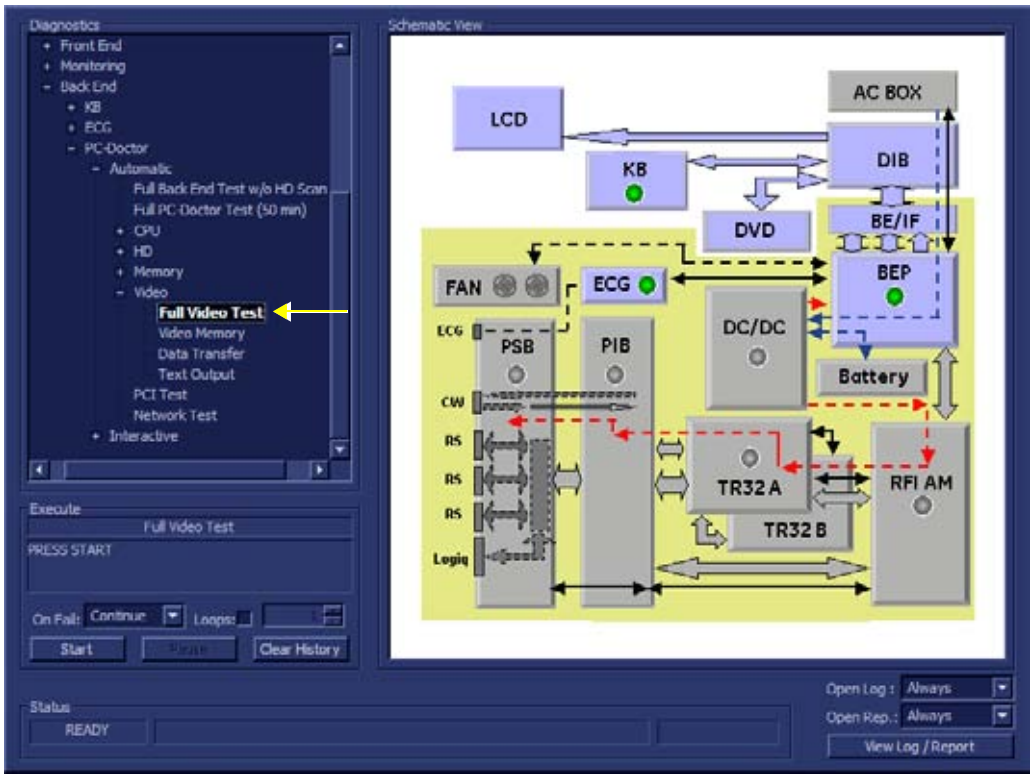

Figure 7-85 Full Video Test

2.) Under the *Special Instructions* area, activate the **Loops** checkbox and select the required number of *Loops* from the combo box.

3.) Adjacent to *On Fail,* select either **Stop** or **Continue**, as required. Stopping on failure enables you to review a failed test, the moment it fails. Alternatively, you may prefer testing to continue on failure and later you may review the report.

4.) Trackball to the **Start** button and press **Set**.

The Full Video Test commences. While the test proceeds, the name of the test currently in progress is displayed in the *Execute* field and the current *Loop #* and specific test are shown below. The messages *Init Done* and *Please Wait* are displayed beside the progress bar in the *Status* area.

As the testing sequence progresses, the progress bar will advance to reflect the test progress. Status indicators in the Data Flow map corresponding to the various system components will be highlighted in the appropriate color to indicate the current test status, as follows:

- **Green:** All recommended tests for these components have been completed and no problems were identified.
- **Red:** Problems were identified in these components during the performance of the test.

7-6-1 Accessing the Back End Diagnostic Test Options (cont'd)

- **Yellow:** The tests executed so far on these components have passed, but not all recommended tests have been performed.

5.) At any stage, trackball to the **Pause** button and press **Set**, if required.

6.) To resume testing (from the point where you paused), trackball to the **Start** button and press **Set**.

When the Full Video Test sequence is complete:

- the *Diagnostic Test* window displays the Finished message
- the View Test Log window opens automatically, listing all tests performed and showing details of which tests and sub-tests passed or failed, as shown in the example in Figure 7-86 "View Test Log - Full Video Test" on page 7-122.

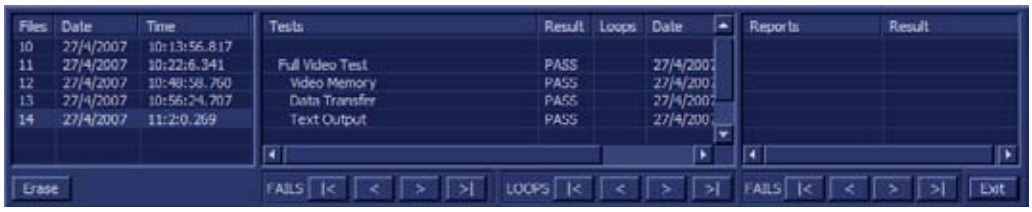

Figure 7-86 View Test Log - Full Video Test

NOTE: For the Full Video Test, several tests are performed in the test sequence; these are listed in the Tests window as shown in Figure 7-86 "View Test Log - Full Video Test" on page 7-122. For each currently-selected test (for example, Video Memory) the corresponding report is listed in Reports on the right.

7.) Use the scroll bars and/or arrows to scroll through the list of *Test* results and review the reports, as required:

- Video Memory
- Video Data Transfer
- Video Text Output

8) When done, trackball to the **Exit** button and press **Set** to close the View Report window.

9) After reviewing the test results, proceed as follows:

- If no problems were identified, it is recommended to re-boot the system (this is obligatory when prompted).
- If no problems were identified but the problem persists, contact your local GE HEALTHCARE field engineer for assistance.
- If errors were identified and the results were not marginal, verify that all system cables and boards are connected (not misplaced) and functioning properly, as described in *Chapter 5 - Components and Function (Theory)*.

  If the problem persists, this indicates that either the specific board you tested is faulty or that another board that supports the operation of this board is faulty. Contact your local GE HEALTHCARE field engineer for assistance.

10.) Trackball to the **Exit** button and press **Set** to close the *View Test Log* dialog box.

11.) Press the <**Esc**> button on the keyboard to close the Diagnostic *Test Window*.

7-6-1 Accessing the Back End Diagnostic Test Options (cont'd)

7-6-1-1-7 PCI Test

NOTE: For a description of this test, refer to the information in "PCI Test" on page 7-17.

1.) In the *Diagnostic Test* window, trackball to **PCI Test** in the list of *PC Doctor* tests available for selection from the Diagnostic Test Tree (see Figure 7-87 "PCI Test" on page 7-123) and press **Set**. The Test name is displayed under *Execute;* the relevant system components to be tested are highlighted light blue in the Schematic View (BEP, Peripherals, Keyboard), as shown below:

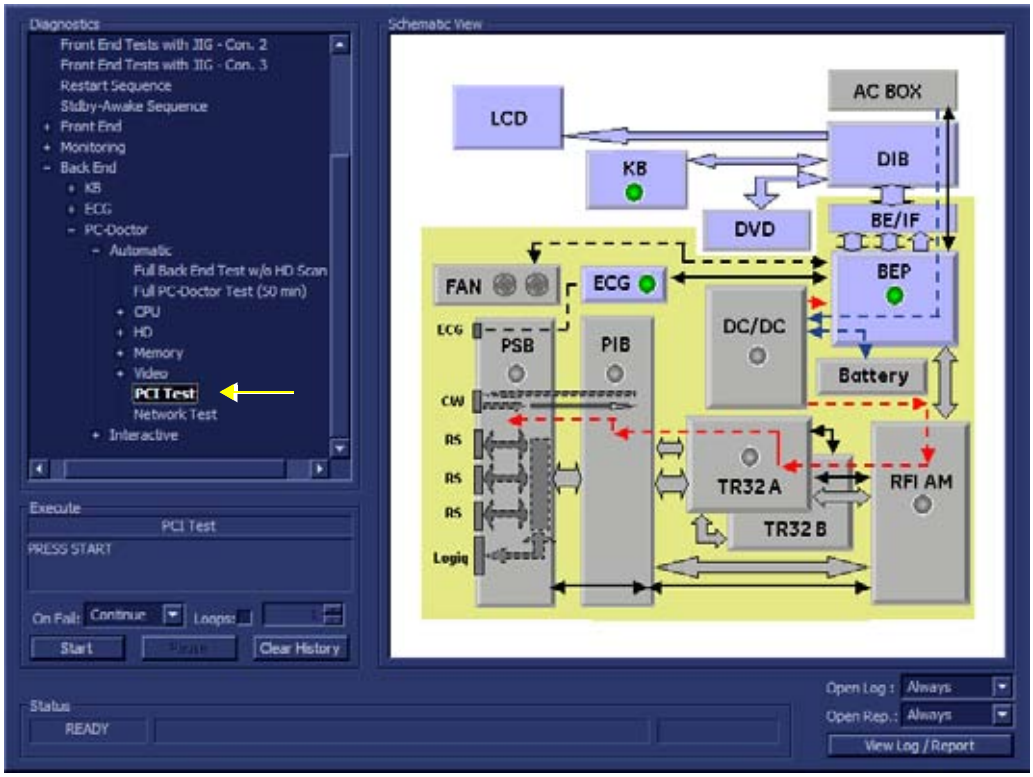

Figure 7-87 PCI Test

2.) Under the *Special Instructions* area, activate the **Loops** checkbox and select the required number of *Loops* from the combo box.

3.) Adjacent to *On Fail,* select either **Stop** or **Continue**, as required. Stopping on failure enables you to review a failed test, the moment it fails. Alternatively, you may prefer testing to continue on failure and later you may review the report.

4.) Trackball to the **Start** button and press **Set**.

The PCI Test commences. While the test proceeds, the name of the test currently in progress is displayed in the *Execute* field and the current *Loop #* and specific test are shown below. The messages *Init Done* and *Please Wait* are displayed beside the progress bar in the *Status* area.

As the testing sequence progresses, the progress bar will advance to reflect the test progress. Status indicators in the Data Flow map corresponding to the various system components will be highlighted in the appropriate color to indicate the current test status, as follows:

- **Green:** All recommended tests for these components have been completed and no problems were identified.
- **Red:** Problems were identified in these components during the performance of the test.

7-6-1 Accessing the Back End Diagnostic Test Options (cont'd)

- **Yellow:** The tests executed so far on these components have passed, but not all recommended tests have been performed.

5.) At any stage, trackball to the **Pause** button and press **Set**, if required.

6.) To resume testing (from the point where you paused), trackball to the **Start** button and press **Set**.

When the PCI Test sequence is complete:

- the *Diagnostic Test* window displays the Finished message
- the View Test Log window opens automatically, listing all tests performed and showing details of which tests and sub-tests passed or failed, as shown in the example in Figure 7-84 "View Test Log - Full Memory Test" on page 7-120.

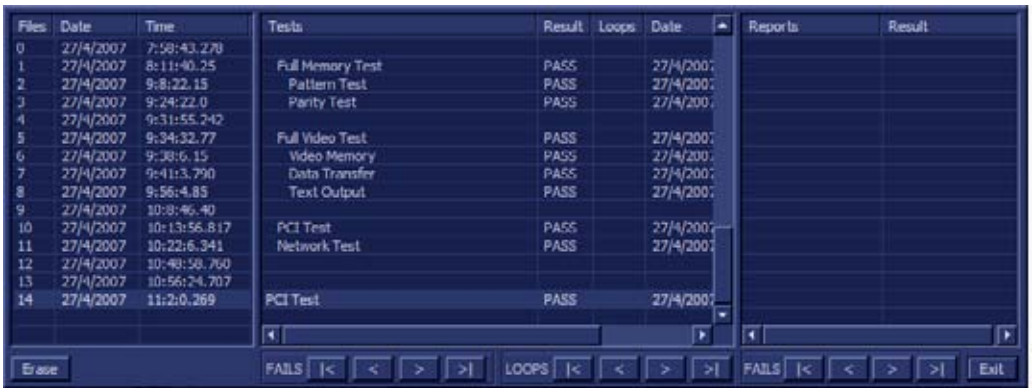

Figure 7-88 View Test Log - PCI Test

NOTE: For the PCI Test, there is one report which is listed in the Tests window as shown in Figure 7-88 "View Test Log - PCI Test" on page 7-124.

7) When done, trackball to the **Exit** button and press **Set** to close the View Report window.

8) After reviewing the test results, proceed as follows:

- If no problems were identified, it is recommended to re-boot the system (this is obligatory when prompted).
- If no problems were identified but the problem persists, contact your local GE HEALTHCARE field engineer for assistance.
- If errors were identified and the results were not marginal, verify that all system cables and boards are connected (not misplaced) and functioning properly, as described in *Chapter 5 - Components and Function (Theory)*.

  If the problem persists, this indicates that either the specific board you tested is faulty or that another board that supports the operation of this board is faulty. Contact your local GE HEALTHCARE field engineer for assistance.

9.) Trackball to the **Exit** button and press **Set** to close the *View Test Log* dialog box.

10.) Press the <**Esc**> button on the keyboard to close the Diagnostic *Test Window*.

7-6-1 Accessing the Back End Diagnostic Test Options (cont'd)

7-6-1-1-8 Network Test

NOTE: For a description of this test, refer to the information in - "Network Test" on page 7-17.

1.) In the *Diagnostic Test* window, trackball to **Network Test** in the list of *PC Doctor* tests available for selection from the Diagnostic Test Tree (see Figure 7-89 "Network Test" on page 7-125) and press **Set**. The Test name is displayed under *Execute;* the relevant system components to be tested are highlighted light blue in the Schematic View (BEP, Peripherals, Keyboard), as shown below:

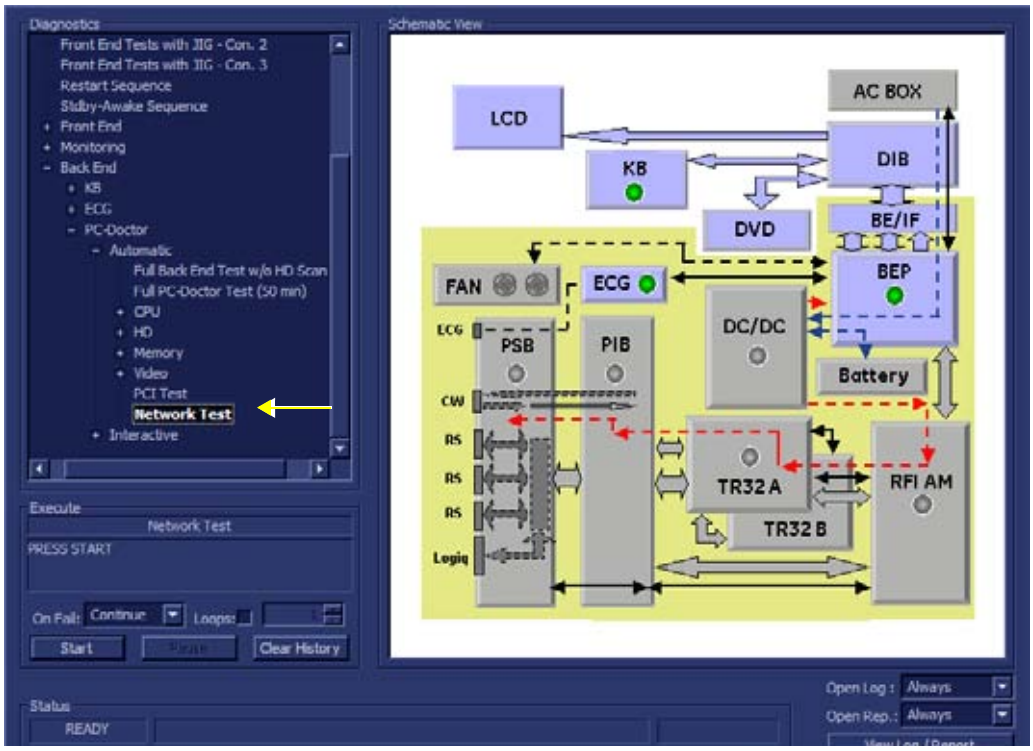

Figure 7-89 Network Test

2.) Under the *Special Instructions* area, activate the **Loops** checkbox and select the required number of *Loops* from the combo box.

3.) Adjacent to *On Fail,* select either **Stop** or **Continue**, as required. Stopping on failure enables you to review a failed test, the moment it fails. Alternatively, you may prefer testing to continue on failure and later you may review the report.

4.) Trackball to the **Start** button and press **Set**.

The Network Test commences. While the test proceeds, the name of the test currently in progress is displayed in the *Execute* field and the current *Loop #* and specific test are shown below. The messages *Init Done* and *Please Wait* are displayed beside the progress bar in the *Status* area.

As the testing sequence progresses, the progress bar will advance to reflect the test progress. Status indicators in the Data Flow map corresponding to the various system components will be highlighted in the appropriate color to indicate the current test status, as follows:

- **Green:** All recommended tests for these components have been completed and no problems were identified.
- **Red:** Problems were identified in these components during the performance of the test.
- **Yellow:** The tests executed so far on these components have passed, but not all recommended tests have been performed.

7-6-1 Accessing the Back End Diagnostic Test Options (cont'd)

5.) At any stage, trackball to the **Pause** button and press **Set**, if required.

6.) To resume testing (from the point where you paused), trackball to the **Start** button and press **Set**.

When the Network Test sequence is complete:

- the *Diagnostic Test* window displays the Finished message
- the View Test Log window opens automatically, listing all tests performed and showing details of which tests and sub-tests passed or failed, as shown in the example in Figure 7-90 "View Test Log - Network Test" on page 7-126

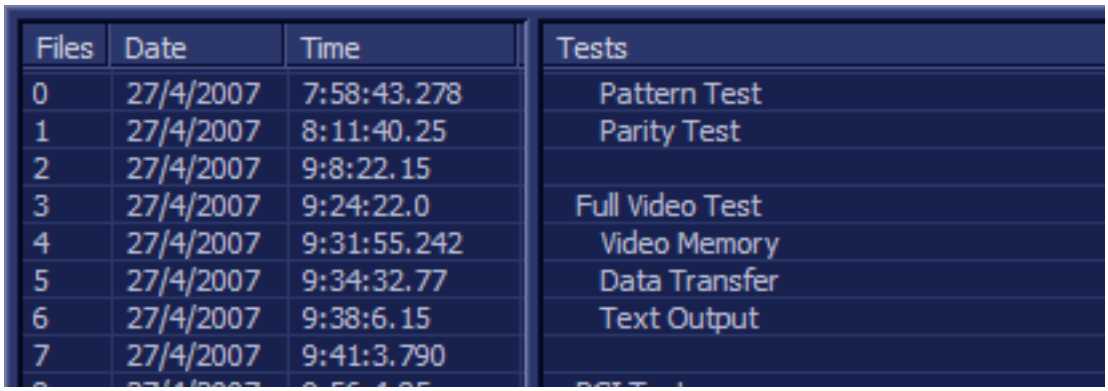

Figure 7-90 View Test Log - Network Test

NOTE: For the Network Test, there is one report which is listed in the Tests window as shown in Figure 7-90 "View Test Log - Network Test" on page 7-126.

7) When done, trackball to the **Exit** button and press **Set** to close the View Report window.

8) After reviewing the test results, proceed as follows:

- If no problems were identified, it is recommended to re-boot the system (this is obligatory when prompted).
- If no problems were identified but the problem persists, contact your local GE HEALTHCARE field engineer for assistance.
- If errors were identified and the results were not marginal, verify that all system cables and boards are connected (not misplaced) and functioning properly, as described in *Chapter 5 - Components and Function (Theory)*.

  If the problem persists, this indicates that either the specific board you tested is faulty or that another board that supports the operation of this board is faulty. Contact your local GE HEALTHCARE field engineer for assistance.

9.) Trackball to the **Exit** button and press **Set** to close the *View Test Log* dialog box.

10.) Press the <**Esc**> button on the keyboard to close the Diagnostic *Test Window*.

Section 7-7
Automatic Error Log

The Vivid S5 N or Vivid S6 N automatically logs the software activity, sequences and error messages that occur during normal operation. Each day's activity is compressed into a single daily logger report, with a time stamp appearing in each line of the report. Additional user comments and screen captures, can also be included in the report. Each day's report is saved in the system for 90 days, during which time they can be recalled and saved to disk.

7-7-1 Adding Bookmarks

The Vivid S5 N and Vivid S6 N systems provide the ability to add bookmarks. When a problem occurs during regular use of the system, simply press **< Alt+B >**. This action will insert a "bookmark" into the system failure logs. The message *Log is Bookmarked* will be displayed on the prompt line, as shown in the example in Figure 7-91 "Message Showing Bookmark Added to Log" on page 7-127.

Figure 7-91 Message Showing Bookmark Added to Log

The bookmark will allow users to place a time-stamp where a particular problem has occurred, while continuing with their current activity with minimum interruption.

NOTE: The log file bookmark will later make it easy for service engineers to locate the location of the failure logging more precisely.

7-7-2 Extracting Logs

Whenever log extraction is necessary due to the occurrence of an error that needs to be reported, or any other reason, follow the instructions below:

1.) While the system is turned-ON in any mode, press **<ALT + D>** on the alphanumeric keyboard.

The System Problem Reporting dialog opens - see Figure 7-92 "System Problem Reporting Dialog" on page 7-128.

2.) In the *Description of Issue* window, type a description of the problem.

Notes should be made regarding the selected probe, the imaging mode and the application that was being used at the time of the malfunction.

If applicable, try to describe the button or key-pushing sequence that immediately preceded the problem.

If applicable, activate the System Lockup checkbox.

7-7-2 Extracting Logs (cont'd)

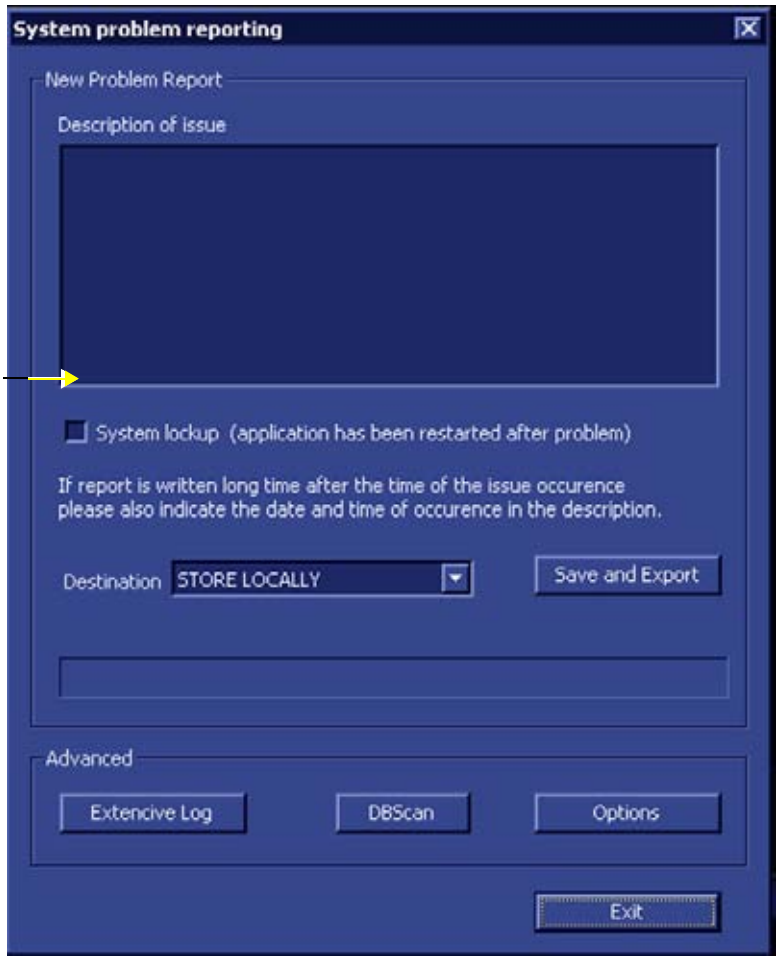

Figure 7-92 System Problem Reporting Dialog

3.) If use of the Advanced features is required, proceed to the following instructions, as applicable:

- "Enabling Extensive Logging" on page 7-130
- "Advanced Options" on page 7-132
- "DB Scan" on page 7-135

After the required advanced features have been selected, continue with step 4 and step 5, below.

4.) From the *Destination* drop-down menu, select the required export destination (CD or Memory Stick) then click **Save and Export**.

A Zip file (named "logfile_<date>_<time>.zip") is copied onto the selected removable media.

When selecting CD as the export destination, first make sure that the CD has been formatted. For details, see "Formatting a CD" on page 7-129.

5.) When done, click the **Exit** button.

The System Problem Reporting dialog closes.

6.) Press **<Ctrl>+E** to eject the media.

7-7-2 Extracting Logs (cont'd)

7-7-2-1 Formatting a CD

Prior to exporting logs or any data onto a CD, this media must be formatted, as described below.

To Format a CD:

1.) Insert the blank CD media into the DVD/CD-RW drive tray.
2.) On the Vivid S5 N or Vivid S6 N system, press the **<Config>** key.
3.) Select the **Connectivity** Tab and activate the **Tools** Tab.
4.) Under *Removable Media*, select the media type **CD** from the Media drop-down menu, as shown in Figure 7-93.

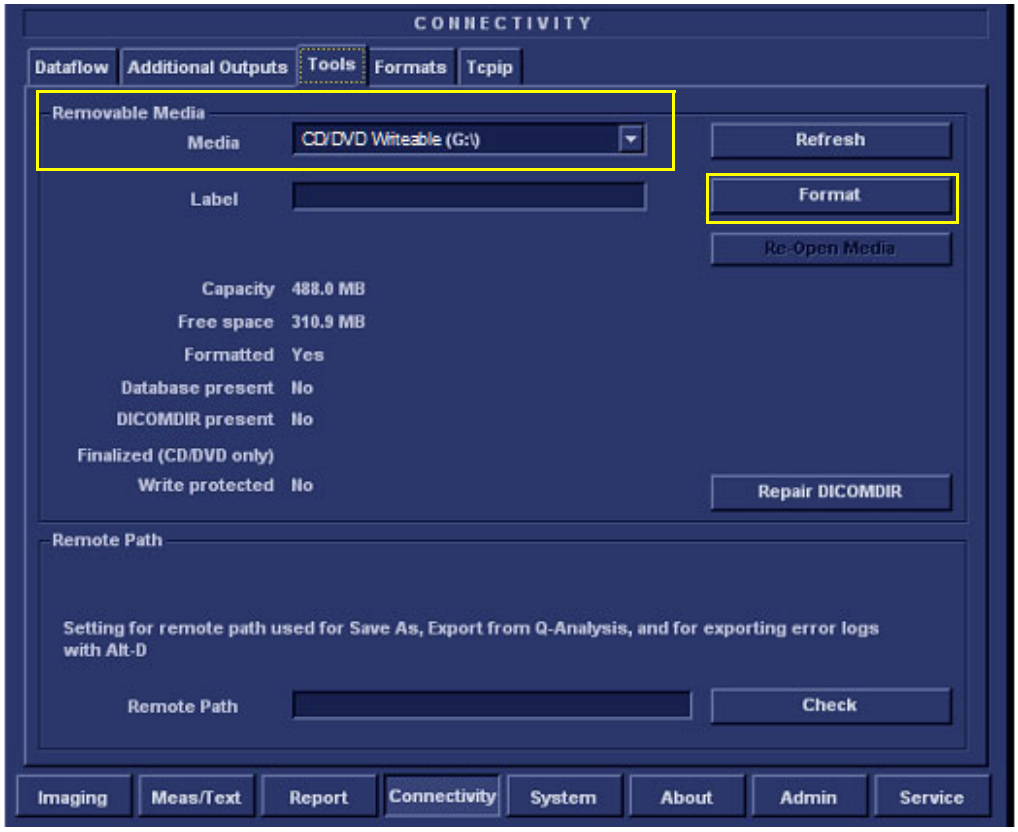

Figure 7-93 Connectivity - Tools - Removable Media

5.) Click the **Format** button.

When CD formatting is complete, a formatting successful message is displayed together with details of the CD capacity.

7-7-2 Extracting Logs (cont'd)

7-7-2-2 Enabling Extensive Logging

NOTE: In some cases, the user may need to activate the Extensive Logging feature. This will allow the system to record logs in a more detailed format, specifically addressing an issue of suspected failure.

As shown in Figure 7-94 "Extensive Logging Dialog" on page 7-131, checkboxes provided in the Extensive Logging dialog enable the user to activate the appropriate failure category (any one or more; any combination) to collect more information regarding particular functionality. Table 7-5 "Extensive Log Categories and Failure Scenarios" on page 7-130 provides recommendations for activating a specific Extensive Log category.

Table 7-5 Extensive Log Categories and Failure Scenarios

Extensive Log Category	Type of Failure
Archive	Loss of patient information or images
	System lock-up due to database corruption
	Display of message warning that the archive is corrupted
	Any suspicion that there may be a problem with the archive
Connectivity	Network is not set up correctly
	Losing network connection
	Problems connecting to a DICOM server (or Reviewing Station)
	Problems with workflow
Front End	Impaired image quality
	Probe not detected
	System boots-up into Fake Mode (no Front End detected)
	Noise, artifacts, etc.
Media Handling	System Lock-up when using removable media (MOD, CD, Disk-on-Key)
	Removable media corrupted during back-up or export
	Removable media not detected
Power Management	Image not sufficiently intense
	Battery charging failed
	System boot-up fails intermittently
	System lock-up during mid-process

7-7-2 Extracting Logs (cont'd)

1.) Perform step 1 and step 2 on page 7-127.

2.) Click the **Extensive Log** button (refer to step 7-92 on page 7-128).

The Extensive Logging dialog opens - see step 7-94, below.

3.) Flag the appropriate checkboxes to activate the categories for which detailed analysis is required (refer to the recommendations in Table 7-5).

Figure 7-94 Extensive Logging Dialog

NOTE: The impact of activating a checkbox would be to generate larger, detailed log files. After usage, make sure to return to the default settings (unflagged) to conserve the size of the log files. After 7 days, the system will automatically return to the default settings.

4.) When done, click **OK**.

The Extensive Logging dialog closes.

7-7-2 Extracting Logs (cont'd)

7-7-2-3 Advanced Options

1.) From the System Problem Reporting dialog (Figure 7-92 "System Problem Reporting Dialog" on page 7-128), click the **Options** button.

The Advanced Export Options screen opens as shown in Figure 7-95 "Advanced Export Options Dialog" on page 7-132.

NOTE: The Advanced Export Options allows you to:

a.) Control the size of log files.
b.) Specify some optional attachments to be added to the log files.

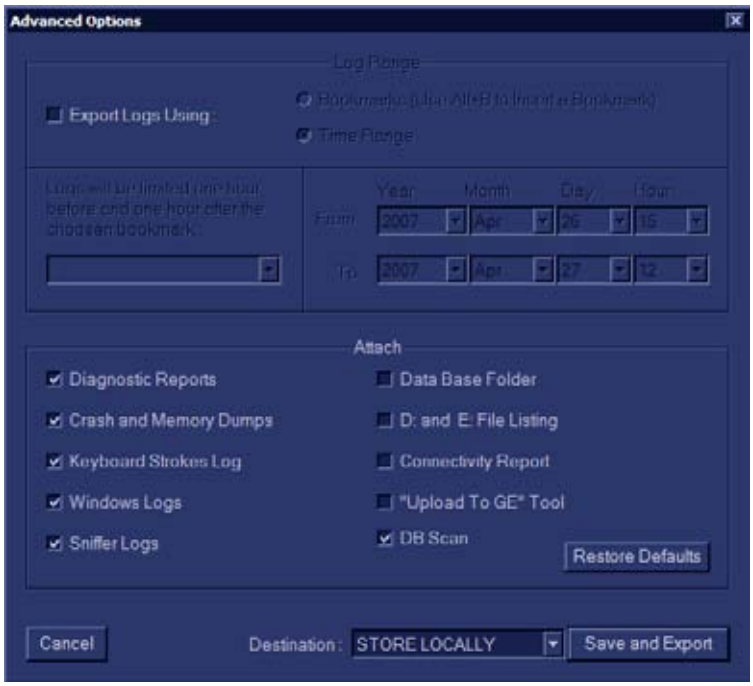

Figure 7-95 Advanced Export Options Dialog

2.) Proceed to select the appropriate settings, as described below.

7-7-2-3-1 Setting the Log File Ranges

NOTE: By default, the log files may be very large as they are not limited by time/date. The user is able to limit the size/timeframe of the log files by choosing the required settings, as described below.

1.) Activate the **Export Logs Using** checkbox, as shown in Figure 7-95 "Advanced Export Options Dialog" on page 7-132.
2.) Proceed to set the required *Log Range*, as follows:

Either:

Activate the **Time Range** radio button, then use the *From:/To:* drop-down lists to define the required time range.

Or:

7-7-2 Extracting Logs (cont'd)

Activate the **Bookmark** radio button, then select the required Bookmark from the drop-down list of bookmarks.
This will export log files which are limited to the range of 1 hour before through 1 hour after the selected bookmark.

7-7-2-3-2 Setting the Log File Attachments

*NOTE: In the Advanced Export Options dialog, from the lower area (labelled **Attach** - see Figure 7-95 "Advanced Export Options Dialog" on page 7-132) users may flag the different items they may wish to attach to the log files (or alternatively disable the checkboxes for those not required).*
Table 7-6 "Attachment Categories and Recommendations for Use" on page 7-133 outlines the different categories of information that may be attached to a log file.

Table 7-6 Attachment Categories and Recommendations for Use

Category	Type of Information and Recommended Use
Diagnostic Reports	Should be used whenever a diagnostic test has failed and it is necessary to forward the information to GE HEALTHCARE for analysis.
Crash and Memory Dumps	Useful for any type of memory crash or system lock-up problem.
Keyboard Strokes Log	Shows the keyboard strokes that were recorded by the system - may be useful in detection of a specific error.
Windows Logs	Contains the Windows operating system logs - supports the application operation.
Sniffer Logs	Applicable if the Network Sniffer Log has been used.
Data Base Folder	Provides more Archive information. Useful for loss of patient information and/or analysis of database, archive, or back-up problems.
D: and E: File Listing	Lists all file names and locations in the hard disk drives: **D** and **E**. Useful in the event of loss of patient information, missing images, lock-up problems, etc.
Connectivity Report	Provides details on the connectivity configuration. Recommended to include this whenever any type of connectivity problem arises.
"Upload to GE" Tool	Enables the user to export the log directly to GE HEALTHCARE for analysis. For details, see "Sending Log Files to GE" on page 7-134.
DBScan	Log files created when performing a scan of the database contain useful information regarding the integrity of the database.

1.) Make sure the required Log File Ranges are set, as previously described.
2.) Under **Attach**, use the checkboxes provided to flag the required attachments, as appropriate.

NOTE: Clicking the Restore Defaults button returns to the default setting whereby all checkboxes in the left column are flagged and all on the right are disabled, as shown Figure 7-95 "Advanced Export Options Dialog" on page 7-132.

3.) When done, from the *Destination* drop-down menu, select the required export destination (CD, Memory Stick, or **GE ftp site** [*recommended*]) then click **Save and Export**.

A Zip file (named "logfile_<date>_<time>.zip") is copied onto the selected removable media.

7-7-2 Extracting Logs (cont'd)

NOTE: Previously, users were required to save log files before exporting them.

When selecting CD as the export destination, first make sure that the CD has been formatted. For details, see 7-7-2-1 "Formatting a CD" on page 7-129.

When export is completed, a message is displayed saying (number of) reports successfully exported.

4.) Click OK to close the window.

5.) When export completed, press **<Ctrl>+E** to eject the media.

7-7-2-3-3 Sending Log Files to GE

After exporting logs (with the **Upload To GE Tool** attachment) to the selected media (i.e. CD or Memory Stick), the media contains the zipped log file along with the binary (**UploadLog.exe** and other attachments) files that perform the upload of all exported files to the GE ftp site.

NOTE: Successful upload of logs to the GE ftp site can only be achieved when the designated PC is connected to the Internet and when all security measures (such as, firewalls) taken at the local network do not prevent the utility from performing the upload.

To Perform the Upload Procedure:

1.) Place the media in any Windows-based PC and run the **UploadLog.exe**.

The Upload Log dialog is displayed:

Figure 7-96 Uploading Log Files

2.) Click **Send**.

The upload process commences and the progress bar advances.

7-7-2 Extracting Logs (cont'd)

When the upload process finishes, the following message is displayed:

Figure 7-97 Upload Successful Message

3.) Click **OK**.

4.) Observe the progress bar completion, as shown in Figure 7-98 "Upload Complete" on page 7-135.

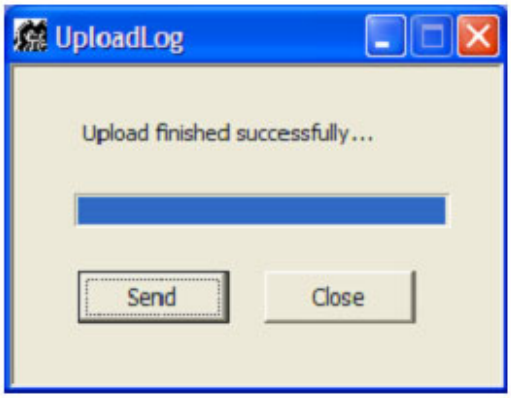

Figure 7-98 Upload Complete

5.) Click **Close** to terminate and exit the Upload utility.

6.) Inform the local GE personnel that you have uploaded files to the GE ftp site.

NOTE: In the event that the upload process fails, check your local network security settings to make sure that they did not prevent the upload. Otherwise, contact GE personnel.

7-7-2-4 DB Scan

To Perform the Database Scan Procedure:

1.) Press **<ALT> + D**.

7-7-2 Extracting Logs (cont'd)

The System Problem Reporting dialog opens:.

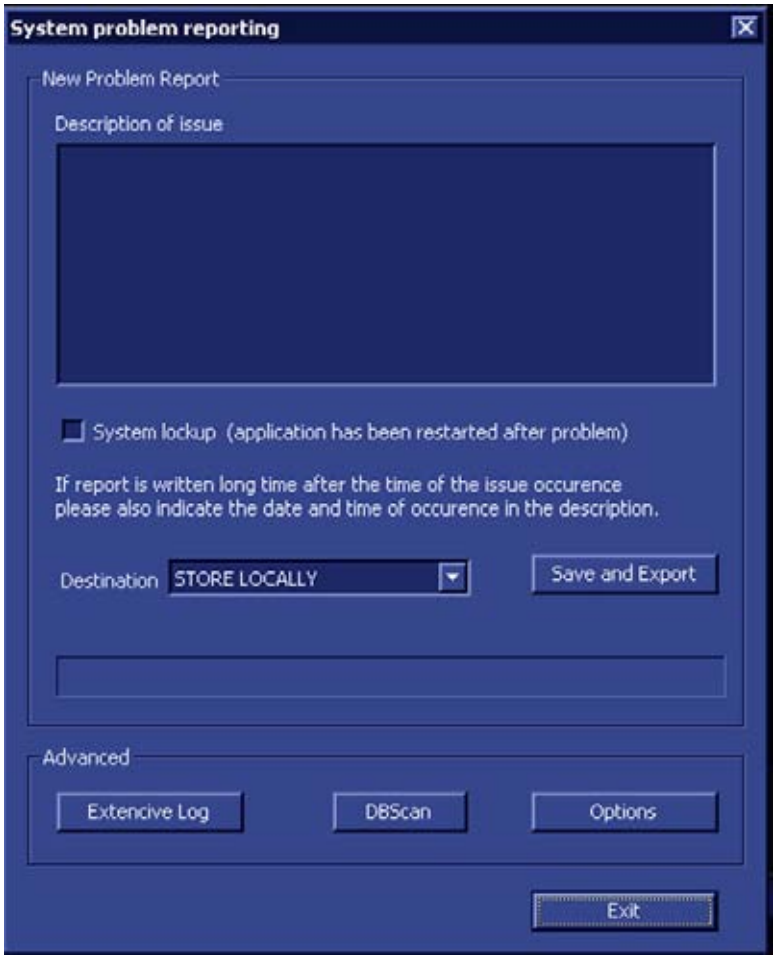

Figure 7-99 System Problem Reporting - Advanced

2.) Under *Advanced*, click on the **DBScan** button.

7-7-2 Extracting Logs (cont'd)

The Database Scanning procedure commences, and a progress bar is displayed together with the message: The action may take a long time. Please wait.....

System problem reporting
New Problem Report
Description of issue
System lockup (application has been restarted after problem)
If report is written long time after the time of the issue occurence please also indicate the date and time of occurence in the description.
Destination
STORE LOCALLY
Save and Export
The action may take a long time. Please wait...
Advanced
Extensive Log
Stop DBScan
Options
Exit

Figure 7-100 Database Scanning Procedure in Progress

*During this procedure, a log file which contains information about the integrity of the database will automatically be created and stored in the **Logs** directory (in the folder name **Log**).*

If required, this log file may be sent as an attachment when exporting log files. For more details, see "Setting the Log File Attachments" on page 7-133.

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Chapter 8
Replacement Procedures

Section 8-1
Overview

8-1-1 Purpose of Chapter 8

This chapter provides replacement procedures for Vivid S5 N and Vivid S6 N system parts, as outlined below.

8-1 Overview 8-1
8-2 Cover Replacement Procedures 8-2
8-3 Control Console Components Replacement Procedures 8-24
8-4 Keyboard Assembly Replacement Procedures. 8-57
8-5 Cable Replacement Procedures 8-84
8-6 Lower Section Components Replacement Procedures 8-98
8-7 Mechanical Components Replacement Procedures 8-159
8-8 Software Loading 8-174
8-9 Peripherals - Replacement Procedures 8-205

Section 8-2
Cover Replacement Procedures

8-2-1 Overview of Covers

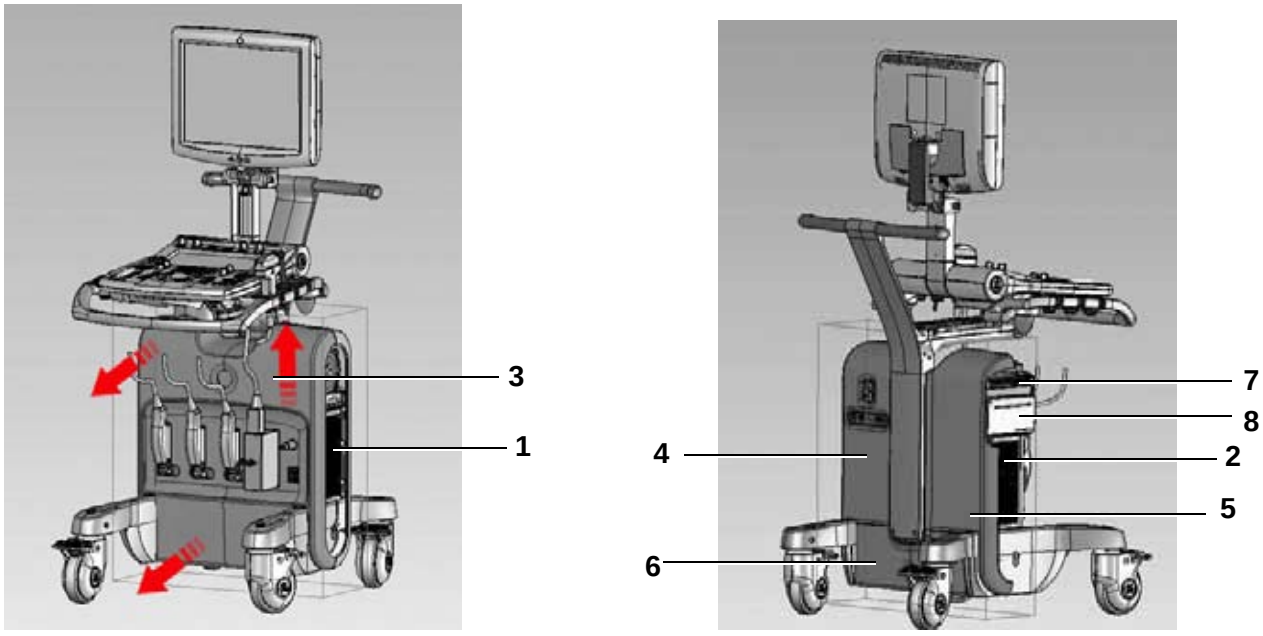


Figure 8-1 Vivid S5 N and Vivid S6 N Ultrasound Units

Table 8-1 Vivid S5 N and Vivid S6 N Ultrasound Unit Covers (Figure 8-1)

Label	Item	Label	Item
1	Left Side Cover	5	Right Rear Cover
2	Right Side Cover	6	Bottom Rear Cover
3	Front Cover	7	DVD Cover
4	Left Rear Cover	8	Black and White Printer

8-2-1-1 Preparations

Shut down the Vivid S5 N or Vivid S6 N ultrasound unit, as described in *Chapter 3* - System Setup.

DANGER: Electrical hazards exist at several points in the system. Familiarize yourself with all hazardous voltages and high current levels before removing any of the covers.

DANGER: DO NOT wear the ESD wrist band strap when removing parts from the power supply unit. Before removing any part of the power unit, turn the power OFF and disconnect the power cord.

CAUTION: Before removing circuit boards, turn the power OFF and wear the ESD wrist band strap.

8-2-1-2 Order of Cover Removal

Remove the system covers in the following order, ***as applicable***:

- Right Side Cover, as described on page 8-4.
- Left Side Cover, as described on page 8-6.
- Right Rear Cover, as described on page 8-10.
- Left Rear Cover, as described on page 8-13.
- Front Cover, as described on page 8-16.
- Bottom Rear Cover, as described on page 8-21.
- DVD Cover, as described on page 8-22.

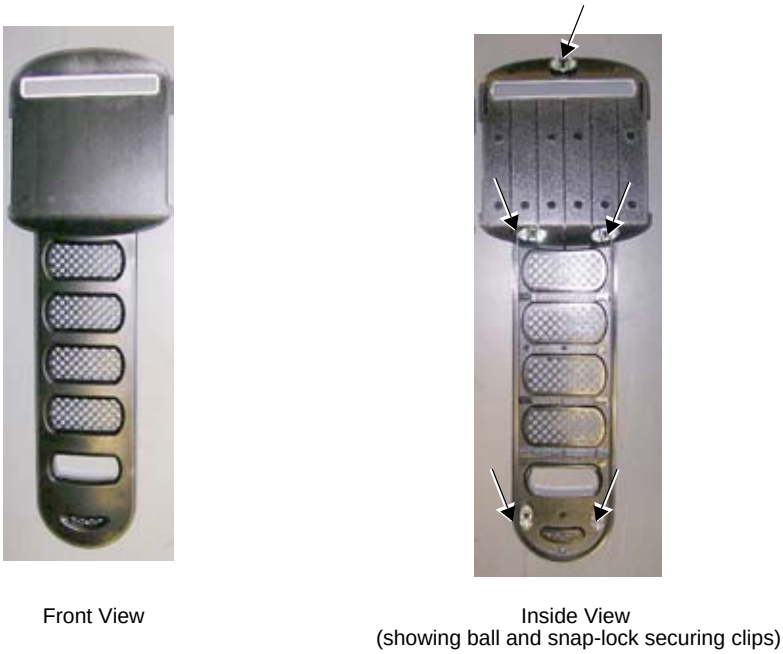
NOTE: ***For removal of system accessories, refer to the following procedures:***

- "Basket Replacement Procedure" on page 8-19
- "Tray Replacement Procedure" on page 8-20

8-2-2 Right Side Cover Replacement Procedure

NOTE: There are two types of Right Side Cover (supplied as part of the cover kit illustrated in Figure 9-1 on page 9-3). The shorter cover is designed for use on Vivid S5 N and Vivid S6 N systems on which a B & W printer (optional) is installed - to allow space for the printer front panel. The longer cover is for use on systems without a B & W printer (designed to close the empty cavity) - see Figure 8-2. Replacement of both types of cover are described below.

NOTE: The right side cover is fastened in position on the side of the system by ball and snap-lock securing clips. The shorter cover has four; the longer cover has five (see the example in Figure 8-2).



Front View

Inside View
(showing ball and snap-lock securing clips)

Figure 8-2 Right Side Cover (Longer Type) - Front and Inside Views

8-2-2-1 Tools

None.

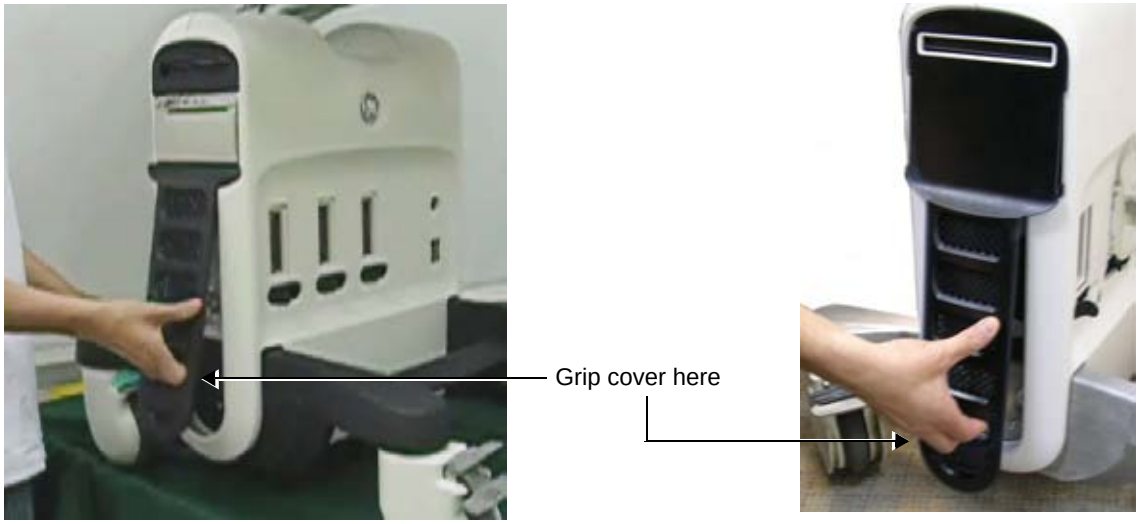
8-2-2-2 Preparations

Shut down the Vivid S5 N or Vivid S6 N ultrasound unit, as described in *Chapter 3* - System Setup.

8-2-2 Right Side Cover Replacement Procedure (cont'd)

8-2-2-3 Right Side Cover Removal Procedure

1) Gripping the recess located near the bottom of the cover (as shown on the left in Figure 8-3), pull the bottom of the cover out *towards* you to release it from the lower securing clip.



System with B&W Printer Installed System without B&W Printer

Figure 8-3 Removing Right Side Cover

2) Pull the top of the cover out *towards* you, releasing it from the upper securing clip.

3) Remove the right side cover from the system.

8-2-2-4 Right Side Cover Installation Procedure

1) Return the right side cover to the correct position on the *right* side of the system, carefully aligning it with the securing clips.

2) Holding the cover by the recess with one hand, push the top of the cover *upwards* and *inwards* with the other hand, until clicks into place.

3) Push the bottom of the cover *upwards* and *inwards*, until it clicks into place.
Make sure the cover is correctly seated.

4.) Proceed to perform the following functionality tests:

- "Grounding Continuity" on page 10-23
- "Chassis Current Leakage Test" on page 10-24
- "Temperatures Test" on page 7-13
- "Fans Speed Test" on page 7-13
- "Fans Speed Setting Test" on page 7-13

8-2-3 Left Side Cover Replacement Procedure

NOTE: The left side cover is fastened in position on the side of the system by 4 ball and snap-lock securing clips. This cover contains an air filter, held in position by securing clips.
For instructions on replacing the air filter only, see "Air Filter Replacement Procedure" on page 8-7.

8-2-3-1 Tools

None.

8-2-3-2 Preparations

Shut down the Vivid S5 N or Vivid S6 N ultrasound unit, as described in *Chapter 3* - System Setup.

8-2-3-3 Left Side Cover Removal Procedure

1) Gripping the recess located near the bottom of the cover (as shown in Figure 8-4), pull the bottom of the cover out *towards* you to release it from the lower securing clip.

Figure 8-4 Removing the Left Side Cover

2) Pull the top of the cover out *towards* you, releasing it from the upper securing clip.
3) Remove the left side cover (together with the attached air filter) from the system.

Figure 8-5 Left Side Cover Removed

8-2-3 Left Side Cover Replacement Procedure (cont'd)

8-2-3-4 Left Side Cover Installation Procedure

1) Return the left side cover (together with the attached air filter) to the correct position on the *left* side of the system, carefully aligning it with the securing clips.
2) Holding the recess with one hand, push the top of the cover *upwards* and *inwards* with the other hand, until clicks into place.
3) Push the bottom of the cover *upwards* and *inwards*, until it clicks into place.
4.) Proceed to perform the following functionality tests:
   - "Grounding Continuity" on page 10-23
   - "Chassis Current Leakage Test" on page 10-24
   - "Temperatures Test" on page 7-13
   - "Fans Speed Test" on page 7-13
   - "Fans Speed Setting Test" on page 7-13

8-2-3-4-1 Air Filter Replacement Procedure

1) Remove the left side cover from the system, as described in "Left Side Cover Replacement Procedure" on page 8-6.
2) Lay the left side cover face-down on a flat, clean surface.
3.) Undo the securing clip that holds one end of the filter in position on the cover, as shown in Figure 8-6.

Figure 8-6 Releasing Air Filter Securing Clip

8-2-3 Left Side Cover Replacement Procedure (cont'd)

4.) Lifting up the free end of the Air Filter, release the other end from the two securing notches on the right cover, as shown in Figure 8-7.

Figure 8-7 Removing the Air Filter

5) Completely remove the air filter from the left cover - see Figure 8-8.

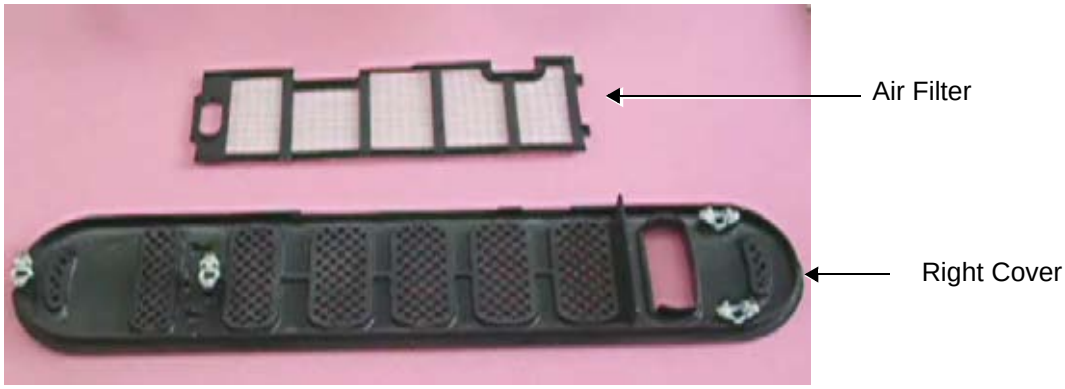


Figure 8-8 Air Filter Removed

6.) Place a new air filter inside the left cover, aligning the two tags located at one end of the filter with the two securing notches on the left cover - refer to Figure 8-7 on page 8-8.

8-2-3 Left Side Cover Replacement Procedure (cont'd)

7.) Make sure the air filter is seated in the correct position then fasten the other end of the air filter onto the cover, by closing the securing clip - refer to Figure 8-6 on page 8-7 and Figure 8-9 below.

Figure 8-9 Air Filter Fastened in Position on the Left Cover

8.) Return the left side cover to the system, as described in the "Left Side Cover Installation Procedure" on page 8-7.

9.) Proceed to perform the following functionality tests:

- "Grounding Continuity" on page 10-23
- "Chassis Current Leakage Test" on page 10-24
- "Temperatures Test" on page 7-13
- "Fans Speed Test" on page 7-13
- "Fans Speed Setting Test" on page 7-13
- "Air Filter Cleaning" on page 10-12

8-2-4 Right Rear Cover Replacement Procedures

8-2-4-1 Tools

Use the appropriate Phillips-type screwdrivers, as indicated in the right rear cover replacement procedures.

8-2-4-2 Preparations

Shut down the Vivid S5 N or Vivid S6 N ultrasound unit, as described in *Chapter 3* - System Setup.

8-2-4-3 Right Rear Cover Removal Procedure

1) Disconnect any peripherals currently connected to the system.
2) Remove the *right* side cover, as described in "Right Side Cover Removal Procedure" on page 8-5.
3) Remove the Basket (as described in the "Basket Removal Procedure" on page 8-19) and/or the Tray (as described in the "Tray Removal Procedure" on page 8-20), as applicable.

NOTE: The right rear cover is secured to the base of the main assembly frame by two screws: one at the top of the cover; one through a securing tab on the inner right side of the cover, as illustrated below.

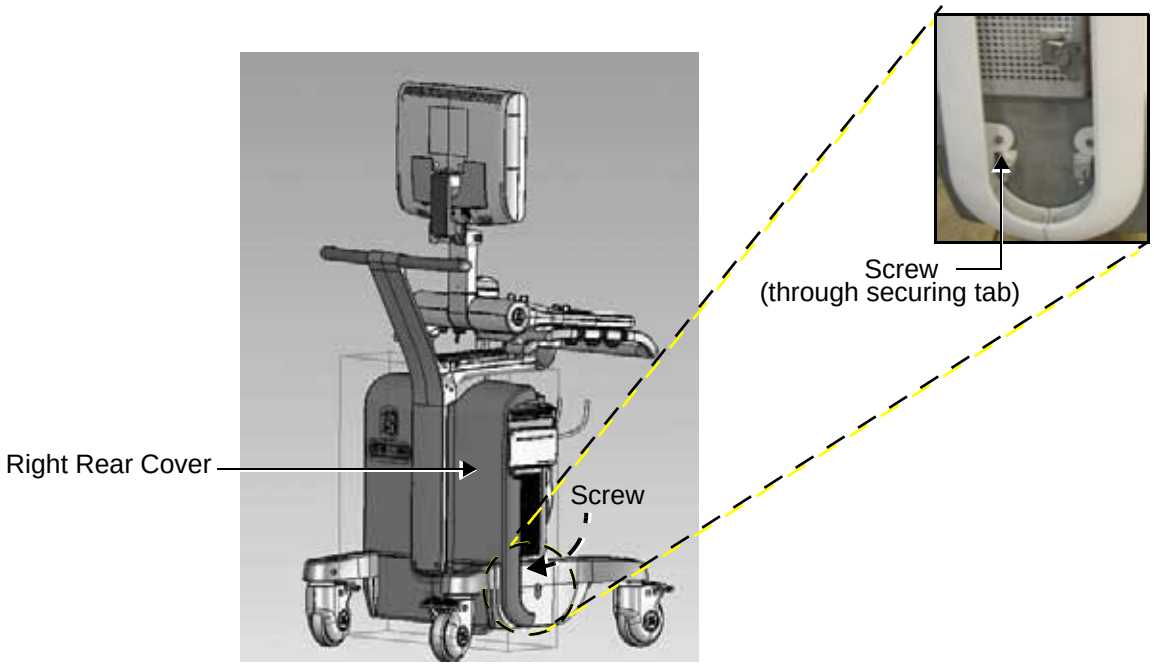


Figure 8-10 Position of Right Rear Cover and Securing Screw

4) Loosen and remove the screw from the top bracket of the cover (see Figure 8-11).
5.) Loosen and remove the screw from the securing tab on the inner right side of the cover (see Figure 8-10 and Figure 8-11).

8-2-4 Right Rear Cover Replacement Procedures (cont'd)

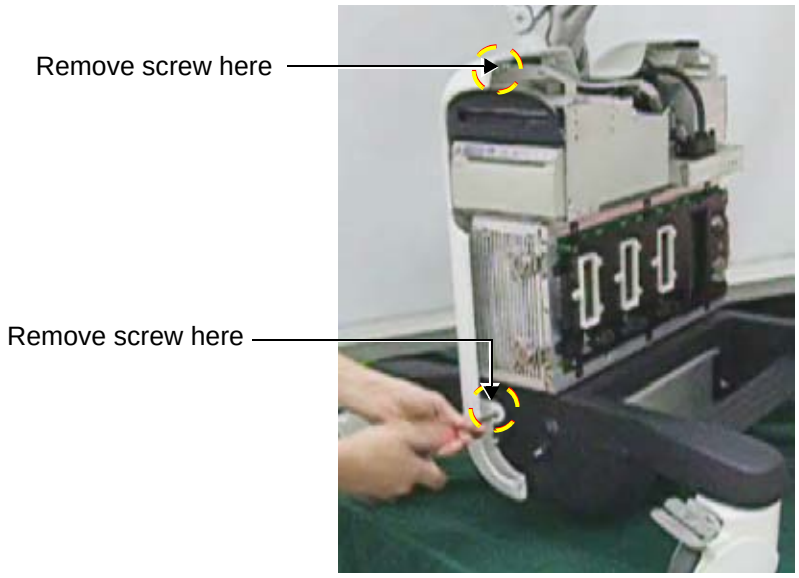


Figure 8-11 Loosening the Securing Screws

6) Carefully lift the cover *upwards* sufficiently to clear the portion of the cover that overlaps the system chassis (shown in Figure 8-12).

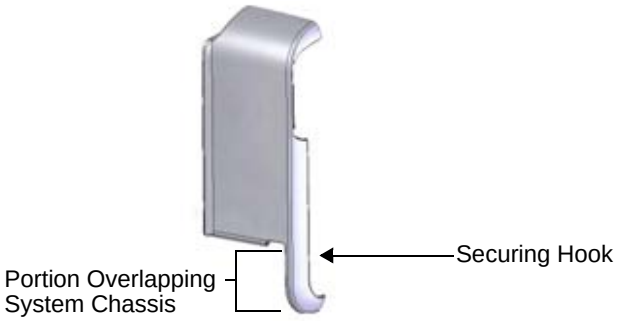


Figure 8-12 Right Rear Cover - Position of Securing Hook

8-2-4 Right Rear Cover Replacement Procedures (cont'd)

7.) Pull the cover *towards* you and remove from the system.

Figure 8-13 Removing the Right Rear Cover

8-2-4-4 Right Rear Cover Installation Procedure

1) Return the right rear cover to its original position at the rear of the main assembly frame, taking care to tilt it sufficiently so that the lower portion overlaps the system chassis on the right side - refer to Figure 8-13 on page 8-12.
2) Make sure the cover is properly aligned with the main assembly frame then push the cover *downwards* to secure it in position.
3) Return the screw (previously removed) to the securing tab on the inner right side of the cover and tighten securely - refer to Figure 8-11 on page 8-11.
4) Return the screw (previously removed) to the top bracket of the cover and tighten securely (refer to Figure 8-11).
5) Return the Basket (as described in the "Basket Installation Procedure" on page 8-19) and/or the Tray (as described in the "Tray Installation Procedure" on page 8-20), as applicable.
6) Install the *right* side cover, as described in the "Right Side Cover Installation Procedure" on page 8-5.
7) Reconnect any peripherals previously connected to the system.
8.) Proceed to perform the following functionality tests:
   - "Grounding Continuity" on page 10-23
   - "Chassis Current Leakage Test" on page 10-24

8-2-5 Left Rear Cover Replacement Procedures

8-2-5-1 Tools

Use the appropriate Phillips-type screwdrivers, as indicated in the left rear cover replacement procedures.

8-2-5-2 Preparations

Shut down the Vivid S5 N or Vivid S6 N ultrasound unit, as described in *Chapter 3* - System Setup.

8-2-5-3 Left Rear Cover Removal Procedure

1) Remove the *left* side cover, as described in "Left Side Cover Removal Procedure" on page 8-6.

2) Remove the Basket (as described in the "Basket Removal Procedure" on page 8-19) and/or the Tray (as described in the "Tray Removal Procedure" on page 8-20), as applicable.

NOTE: The left rear cover is secured to the base of the main assembly frame by a screw through a securing tab on the inner left side of the cover, as illustrated below.

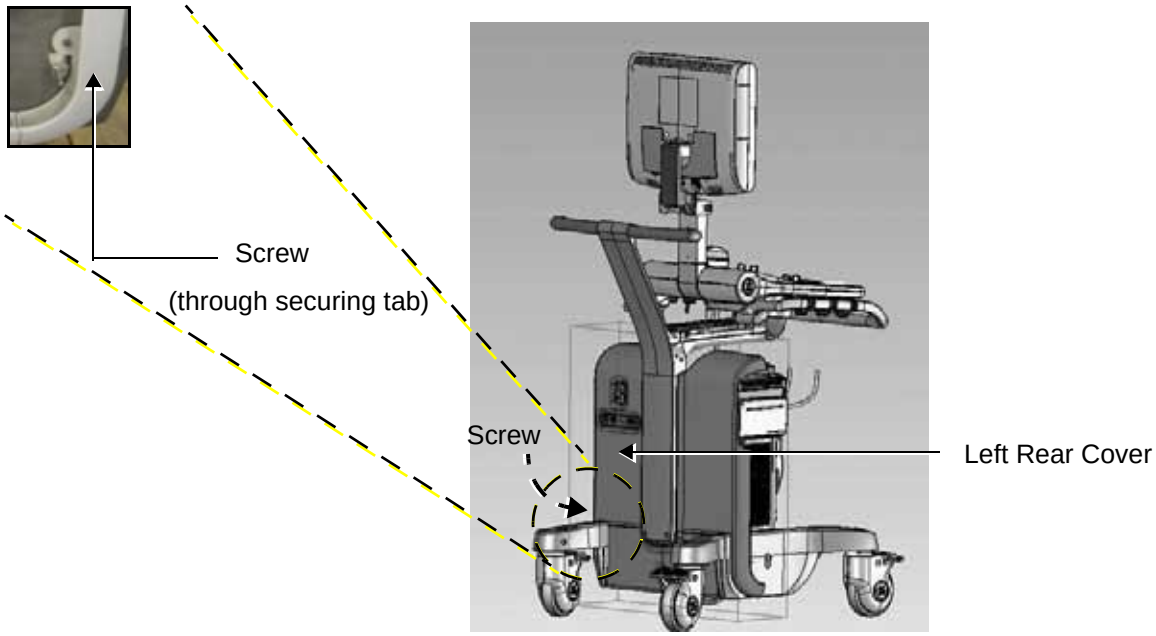


Figure 8-14 Position of Left Rear Cover and Securing Screw

3) Loosen and remove the screw from the securing tab on the inner side of the left cover (see Figure 8-15).

8-2-5 Left Rear Cover Replacement Procedures (cont'd)

Figure 8-15 Loosening the Securing Screw

4) Pull the cover *upwards* to release the two securing hooks (located on the inner right side of the cover) from the main assembly frame - see Figure 8-16.

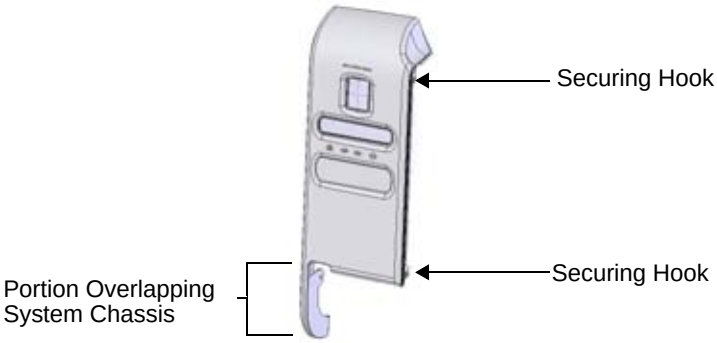


Figure 8-16 Left Rear Cover - Position of Securing Hooks

5) Carefully lift the cover *upwards* sufficiently to clear the portions of the cover that overlap the system chassis (shown in Figure 8-17).

8-2-5 Left Rear Cover Replacement Procedures (cont'd)

Figure 8-17 Removing the Left Rear Cover

6.) Pull the cover *towards* you and remove from the system.

8-2-5-4 Left Rear Cover Installation Procedure

1) Return the left rear cover to its original position at the rear of the main assembly frame, taking care to tilt it sufficiently so that the lower portion overlaps the system chassis on the left side - refer to Figure 8-17 on page 8-15.
2) Carefully align the two securing hooks located on the inner right side of the cover (refer to Figure 8-16 on page 8-14) with the holding screws on the main assembly frame, then push the cover *downwards* to secure it in position.
3) Return the screw (previously removed) to the securing tab on the inner left side of the cover and tighten securely - refer to Figure 8-15 on page 8-14.
4) Return the Basket (as described in the "Basket Installation Procedure" on page 8-19) and/or the Tray (as described in the "Tray Installation Procedure" on page 8-20), as applicable.
5) Install the *left* side cover, as described in "Left Side Cover Installation Procedure" on page 8-7.
6.) Proceed to perform the following functionality tests:
   - "Grounding Continuity" on page 10-23
   - "Chassis Current Leakage Test" on page 10-24

8-2-6 Front Cover Replacement Procedures

8-2-6-1 Tools

Use the appropriate Phillips-type screwdriver, as indicated in the front cover replacement procedures.

8-2-6-2 Preparations

Shut down the Vivid S5 N or Vivid S6 N ultrasound unit, as described in *Chapter 3* - System Setup.

8-2-6-3 Front Cover Removal Procedure

1) Remove the *left* and *right* side covers, as described in "Left Side Cover Removal Procedure" on page 8-6 and the "Right Side Cover Removal Procedure" on page 8-5.
2) Remove all probes and ECG cables currently connected to the system.
3) Place each of the three RS connector locking mechanisms in the open position (refer to Figure 8-18).

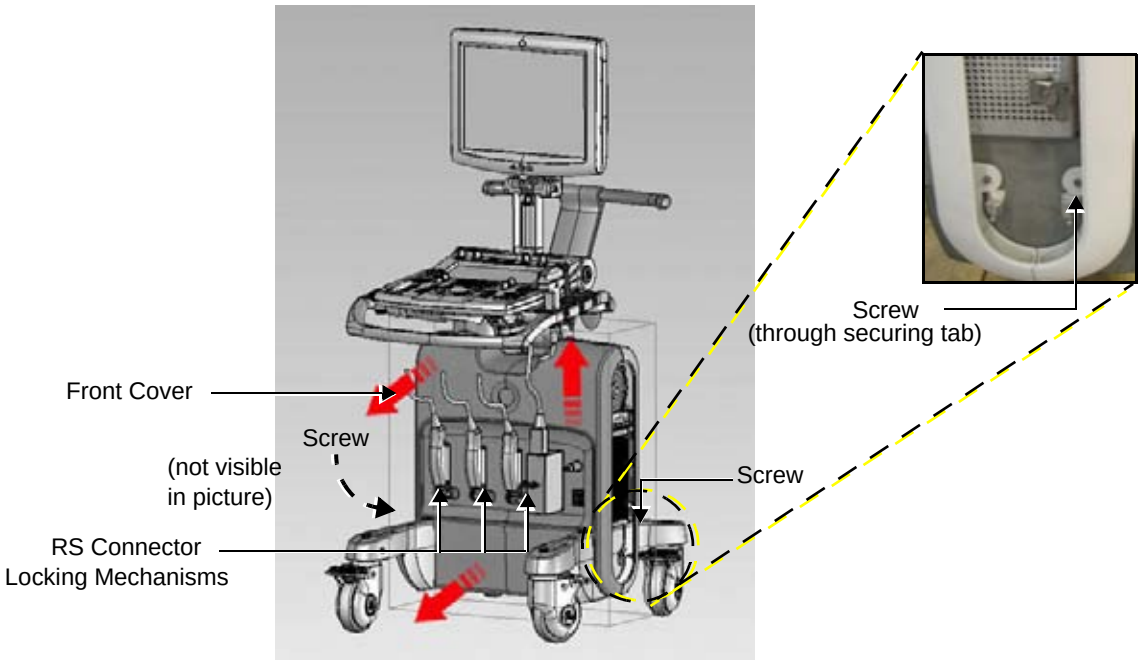


Figure 8-18 Position of Front Cover and Securing Screws

NOTE: The front cover is secured to the base of the main assembly frame by a screw through a securing tab on each side of the cover (left and right inner side), as illustrated above.

4) Loosen and remove the two screws from the securing tabs (one each side of the cover - *left* and *right* - inner sides) - see Figure 8-19.

8-2-6 Front Cover Replacement Procedures (cont'd)

Front Cover - from Left Side

Front Cover - from Right Side

Figure 8-19 Removing Screws from Front Cover Securing Tabs

5) Pull the *lower* portion of the cover away from the system main assembly frame to release it from the ball and snap-lock securing clips (see [**1**] in Figure 8-20). Continue pulling it towards you, until it is touching the footrest.

6) Pull the *upper* portion of the cover away from the system main assembly frame to release it from the snap-lock securing clips (see [**2**] in Figure 8-20).

7.) Carefully lift the cover *upwards* sufficiently to clear the portions of the cover that overlap the system chassis (see [**3**] in Figure 8-20).

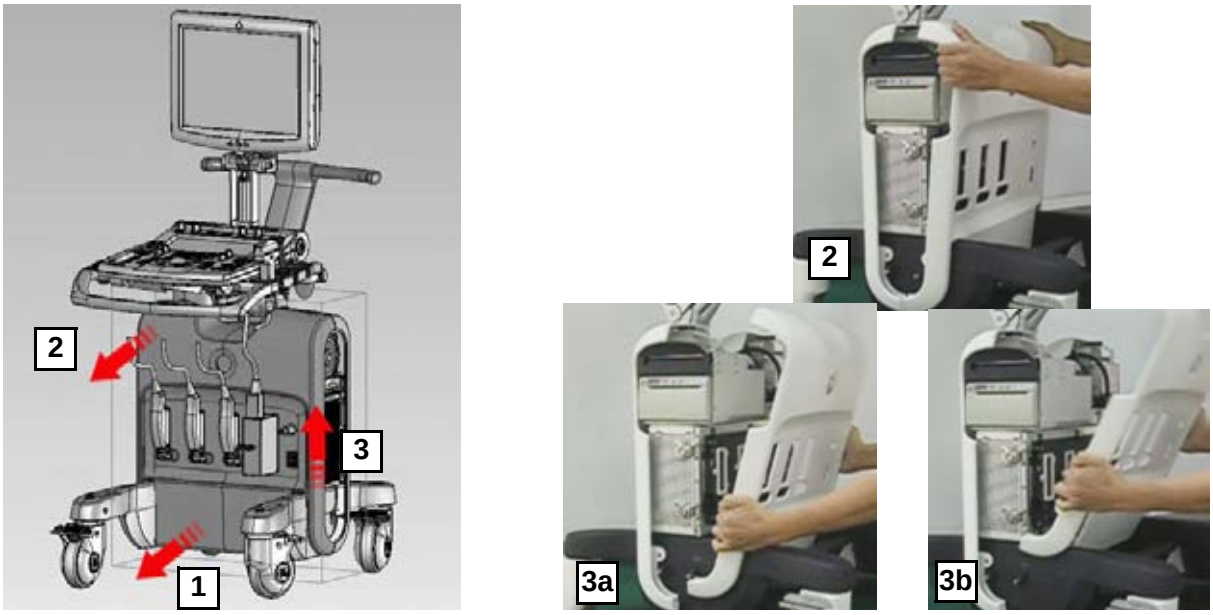


Figure 8-20 Removing the Front Cover

8-2-6 Front Cover Replacement Procedures (cont'd)

8.) Tilting the cover away from the main assembly frame (to clear the keyboard), continue pulling it towards you until it is completely removed from the system.

8-2-6-4 Front Cover Installation Procedure

1) Return the front cover to its original position at the front of the main assembly frame, taking care to tilt it sufficiently so that the upper portion clears the keyboard, and the lower portion overlaps the system chassis correctly on either side.
2) Push the *upper* portion of the cover onto the main assembly frame until it clicks into the snap-lock securing clip (refer to Figure 8-18 on page 8-16).
3) Push the *lower* portion of the cover onto the main assembly frame until it clicks into the snap-lock securing clip (refer to Figure 8-18 on page 8-16).
4) Return the screws (previously removed) to the securing tabs each side of the cover and tighten securely.
5) Install the *left* and *right* side covers, as described in "Left Side Cover Installation Procedure" on page 8-7 and "Right Side Cover Installation Procedure" on page 8-5.
6.) Proceed to perform the following functionality tests:
   - "Grounding Continuity" on page 10-23
   - "Chassis Current Leakage Test" on page 10-24

8-2-7 Basket Replacement Procedure

8-2-7-1 Tools

None

8-2-7-2 Preparations

Shut down the Vivid S5 N or Vivid S6 N ultrasound unit, as described in *Chapter 3* - System Setup.

8-2-7-3 Basket Removal Procedure

1) Remove all contents from the basket.
2) Working from the rear of the system, hold the basket with both hands and carefully lift it *upwards* to release it from the two snap-lock securing clips - one on either side of the keyboard interface column - see Figure 8-21.
3) Remove the basket.

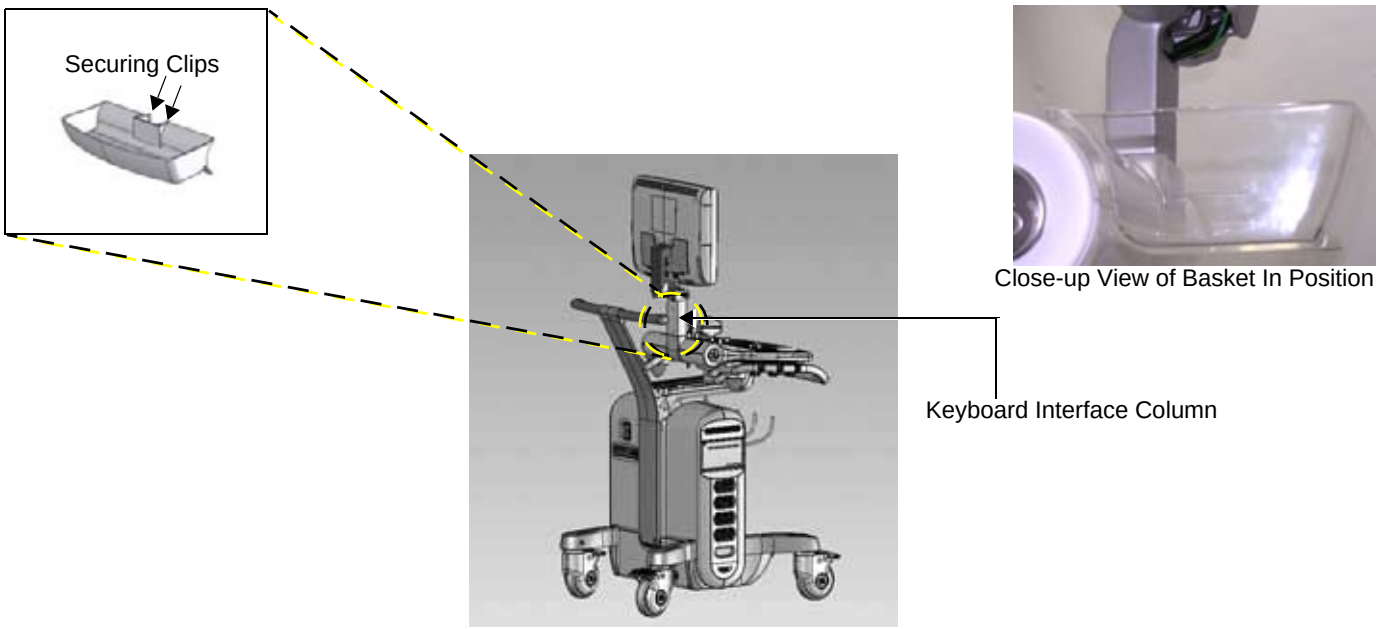


Figure 8-21 Position of Basket Securing Clips

8-2-7-4 Basket Installation Procedure

1) Working from the rear of the system, return the basket to its original position on the keyboard interface column (see close-up view in Figure 8-21, above.
2) Holding the basket with both hands, carefully push it *downwards* to secure it on the two snap-lock securing clips - one on either side of the column - refer to Figure 8-21.

CAUTION **The Basket has a maximum carrying capacity of 4 Kgs. DO NOT EXCEED THIS LIMIT!**

3.) Proceed to perform the following functionality tests:

- "Monitor Movement Test" on page 4-34
- "Operator Panel Movement Test" on page 4-33

8-2-8 Tray Replacement Procedure

8-2-8-1 Tools

None

8-2-8-2 Preparations

Shut down the Vivid S5 N or Vivid S6 N ultrasound unit, as described in *Chapter 3* - System Setup.

8-2-8-3 Tray Removal Procedure

1) Remove all contents from the tray.
2) Working from the rear of the system, hold the tray with both hands and carefully lift it *upwards* and *towards* you to release it from the two snap-lock securing clips - one on either side of the main support column - see Figure 8-22.
3) Remove the tray.

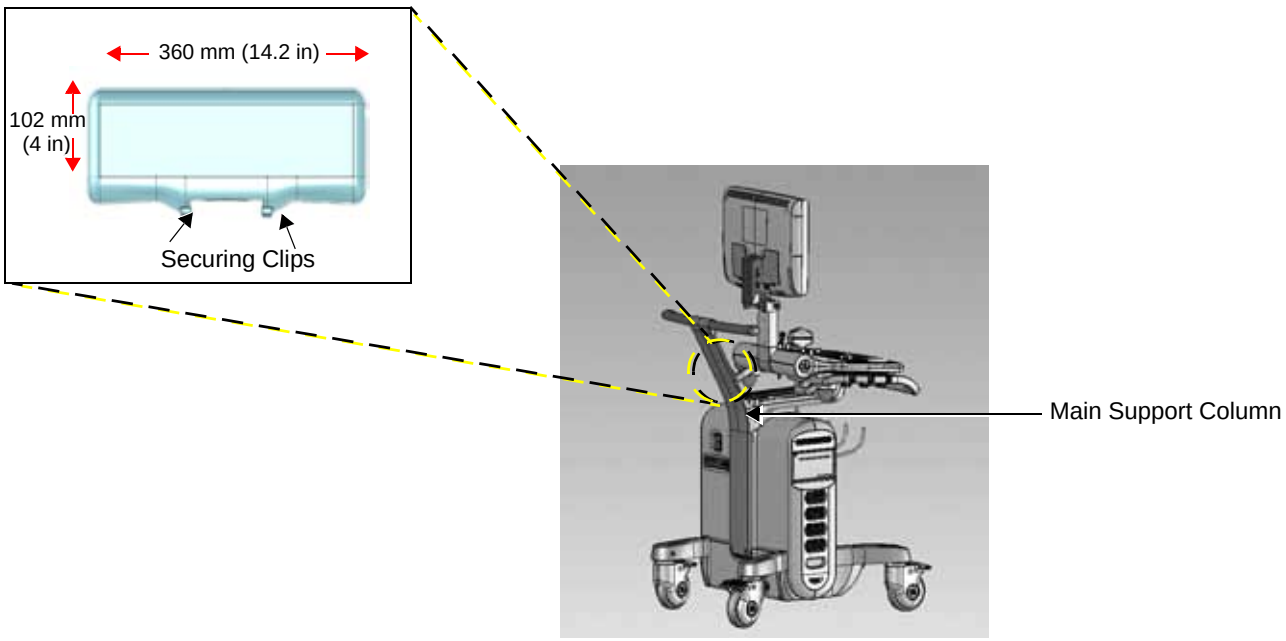


Figure 8-22 Position of Tray Securing Clips

8-2-8-4 Tray Installation Procedure

1) Working from the rear of the system, return the tray to its original position on the main support column.
2) Holding the tray with both hands, carefully push it *downwards* to secure it on the two snap-lock securing clips - one on either side of the column - refer to Figure 8-22.

CAUTION **The Tray has a maximum carrying capacity of up to 1 Kg (2.2 lbs).**
DO NOT EXCEED THIS LIMIT!

3.) Proceed to perform the following functionality test:
- "Arm Movement Test" on page 4-33

8-2-9 Bottom Rear Cover Replacement Procedures

8-2-9-1 Tools

None.

8-2-9-2 Preparations

Shut down the Vivid S5 N or Vivid S6 N ultrasound unit, as described in *Chapter 3* - System Setup.

8-2-9-3 Bottom Rear Cover Removal Procedure

NOTE: The bottom rear cover is secured to the base of the main assembly frame by five ball and snap-lock securing clips on the inner side of the cover - two at the top and three at the bottom - as illustrated below.

1) Working from the rear of the system, pull the *lower* portion of the cover away from the system main assembly frame to release it from the lower snap-lock securing clips (see Figure 8-23).
2) Pull the *upper* portion of the cover away from the system main assembly frame to release it from the upper snap-lock securing clips (see Figure 8-23).
3.) Remove the cover.

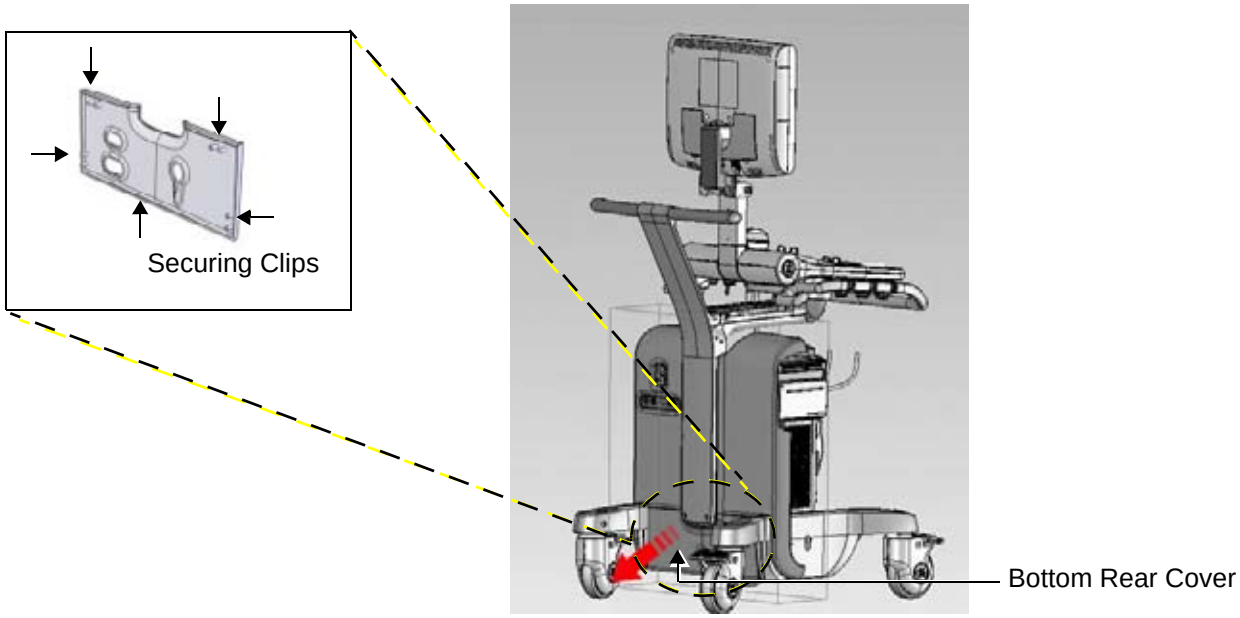


Figure 8-23 Position of Bottom Rear Cover Securing Clips

8-2-9-4 Bottom Rear Cover Installation Procedure

1) Return the bottom rear cover to its original position at the rear of the system.
2) Align the top of the cover with the two *upper* securing clips and push it until it clicks into position.
3) Align the bottom of the cover with the three *lower* securing clips and push it until it clicks into position.
4.) Proceed to perform the following functionality tests:
   - "Grounding Continuity" on page 10-23
   - "Chassis Current Leakage Test" on page 10-24

8-2-10 DVD Cover Replacement Procedure

8-2-10-1 Tools

Use the appropriate Phillips screwdriver, as indicated in the DVD cover replacement procedure.

8-2-10-2 Preparations

Shut down the Vivid S5 N or Vivid S6 N ultrasound unit, as described in *Chapter 3* - System Setup.

8-2-10-3 DVD Cover Removal Procedure

1) Raise the control console to its *maximum* height.
2) Remove the *left* and *right* side covers, as described in "Left Side Cover Removal Procedure" on page 8-6 and the "Right Side Cover Removal Procedure" on page 8-5.
3) Remove the front cover, as described in "Front Cover Removal Procedure" on page 8-16.
4.) Remove the right rear cover, as described in the "Right Rear Cover Removal Procedure" on page 8-10
5.) Working from the top of the peripheral cage, unfasten the two Phillips screws that secure the DVD cover in position - see Figure 8-24.

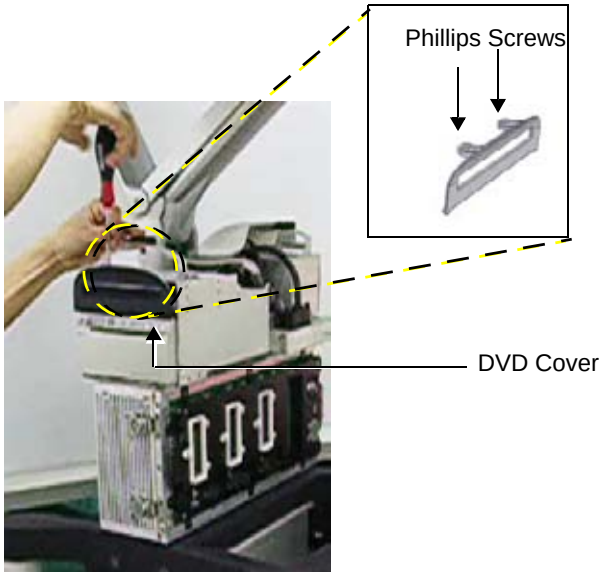


Figure 8-24 Position of DVD Cover Securing Screws

8-2-10 DVD Cover Replacement Procedure (cont'd)

6.) Pull out and remove the DVD cover.

Figure 8-25 DVD Cover Removed

8-2-10-4 DVD Cover Installation Procedure

1) Make sure the control console is raised to its *maximum* height.
2) Return the DVD cover to the correct position on the system, carefully aligning the top of the cover with the screw holes on the top of the peripheral cage.
3.) Working from the top of the peripheral cage, fasten the two screws (previously loosened) and tighten securely to fasten the DVD cover in position - see Figure 8-24.
4) Install the front cover, as described in "Front Cover Installation Procedure" on page 8-18.
5) Install the right rear cover, as described in the "Right Rear Cover Installation Procedure" on page 8-12
6) Install the *left* and *right* side covers, as described in "Left Side Cover Installation Procedure" on page 8-7 and the "Right Side Cover Installation Procedure" on page 8-5.
7.) Proceed to perform the following functionality tests:
   - "Grounding Continuity" on page 10-23
   - "Chassis Current Leakage Test" on page 10-24

Section 8-3
Control Console Components Replacement Procedures

8-3-1 Monitor Replacement Procedure

NOTE: This section describes the procedure for replacing either a 15" or 17" monitor, as applicable (see details below):

- **Vivid S5 N systems**: 15" monitor
- **Vivid S6 N systems**: 17" monitor

NOTE: For monitor operation and image quality calibration instructions for both the 15" and the 17" monitor, refer to the information provided in Chapter 6 - Service Adjustments.

8-3-1-1 Tools

Use the appropriate Phillips screwdriver, as indicated in the monitor replacement procedures.

8-3-1-2 Preparation

Shut down the Vivid S5 N ultrasound unit, as described in *Chapter 3* - System Setup.

8-3-1-3 Monitor Removal Procedure

1) Working from the front of the system, lower the console to the *maximum down* position.
2) Make sure that the console is aligned in the central position (not pulled to one side or the other).
3) Working from the left or right of the support column, pull the locking pin slightly *out* to release the monitor from the locked upright position, as shown in Figure 8-26 below.

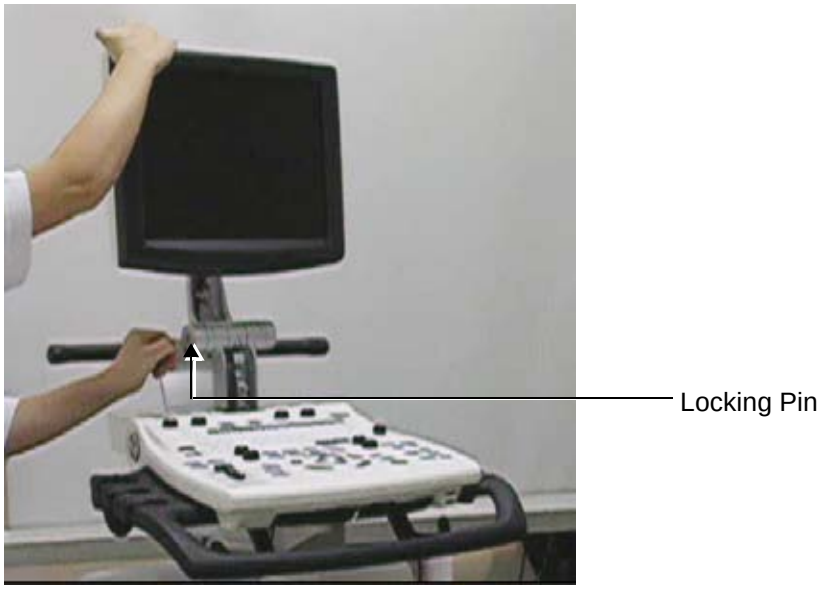


Figure 8-26 Releasing the Monitor from the Locked Upright Position

8-3-1 Monitor Replacement Procedure (cont'd)

4.) Carefully fold the monitor *forwards* until it is in the fully-folded position (i.e., face down), as shown in Figure 8-27 below.

Figure 8-27 Monitor in Fully-folded Position

5.) Remove the two Phillips screws that secure the LCD rear to the rear of the monitor (see Figure 8-27).

6.) Lift the monitor to the upright position (perpendicular to the keyboard) and remove the LCD rear cover by sliding it *downwards* and lifting it off the rear of the monitor - see Figure 8-28 below.

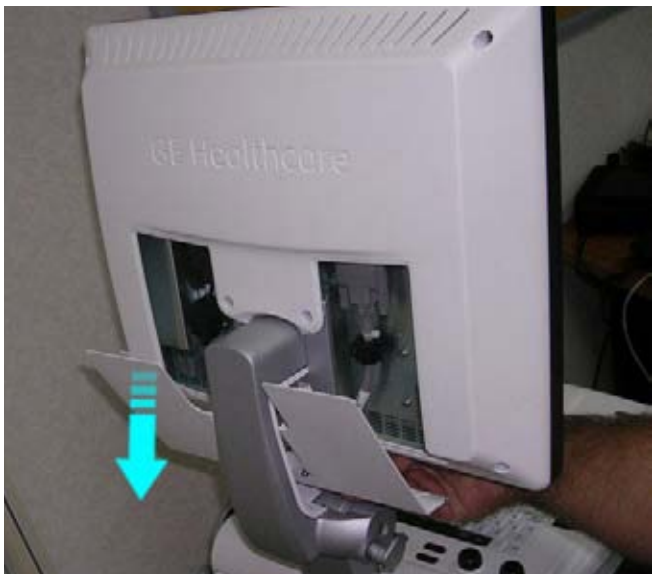


Figure 8-28 Removing the LCD Rear Cover

8-3-1 Monitor Replacement Procedure (cont'd)

7.) Using a screwdriver, release the DVI cable and the power cable connectors from the monitor (loosening the two screws on each side of the cables to disconnect them) - see Figure 8-30 below.

Figure 8-29 Disconnecting the Power and DVI Cables

8.) Loosen and remove the four Phillips screws that secure the monitor to the support column, as indicated in Figure 8-30 below.
Do not let the screws fall while performing this step.

Figure 8-30 Removing the Securing Screws

9.) Using two hands, carefully lift the monitor away from the securing bracket on the support column to remove it from the system.

10.) Carefully lie the monitor face-down on a clean, soft surface.

8-3-1-4 Monitor Installation Procedure

1) Working from the front of the system, make sure the console is in the *maximum down* position and that is aligned in the central position (not pulled to one side or the other).

2.) Using two hands, carefully lift a new monitor onto the system, placing it perpendicular to the keyboard (against the mounting bracket on the support column) while aligning the screw holes with the holes in the bracket - refer to Figure 8-30.

3.) Return and fasten the four Phillips screws (previously removed) to properly secure the monitor to the support column - refer to Figure 8-30.

4.) Reconnect the DVI cable and the Data cable to the monitor (fasten securely in position using the two screws on each side of the cables) - refer to Figure 8-29 on page 8-26.

5.) Return the LCD rear cover to the monitor by sliding it *upwards* from the rear until it clicks into position - refer to Figure 8-28 on page 8-25.

6.) Return and fasten the two Phillips screws to secure the LCD rear to the rear of the monitor (see Figure 8-27).

7) Working from the left or right of the support column, push the locking pin *in* to secure the monitor in the locked position - refer to Figure 8-26 on page 8-24.

8.) Adhere the appropriate Vivid S5 N or Vivid S6 N system label to the rear of the monitor.

9.) Set the appropriate LCD type, as described in 6-1-2-6 "Display Type Setup" on page 6-5.

10.) Proceed to perform the following functionality tests:

- "Grounding Continuity" on page 10-23
- "Chassis Current Leakage Test" on page 10-24
- "Monitor Movement Test" on page 4-34
- "Monitor Test" on page 4-21

11.) For the next stage of the monitor installation procedure, proceed to the instructions for Image Quality Calibration, as described in *Chapter 6 - Service Adjustments*.

12.) Complete the procedure by setting the display type, as described in 6-1-2-6 "Display Type Setup" on page 6-5.

8-3-2 Monitor Arm Replacement Procedure

8-3-2-1 Tools

Use the appropriate flat and Phillips type screwdrivers and the appropriate Allen keys.

8-3-2-2 Preparation

Shut down the Vivid S5 N or Vivid S6 N ultrasound unit, as described in *Chapter 3* - System Setup.

8-3-2-3 Monitor Arm Replacement Procedure

1) Remove the Monitor as described in the "Monitor Removal Procedure" on page 8-24.
2) Remove the Keyboard Assembly as described in the "Keyboard Assembly Removal Procedure" on page 8-37.

Note: Figure 8-31 below shows the general context of the Monitor Arm and work area.

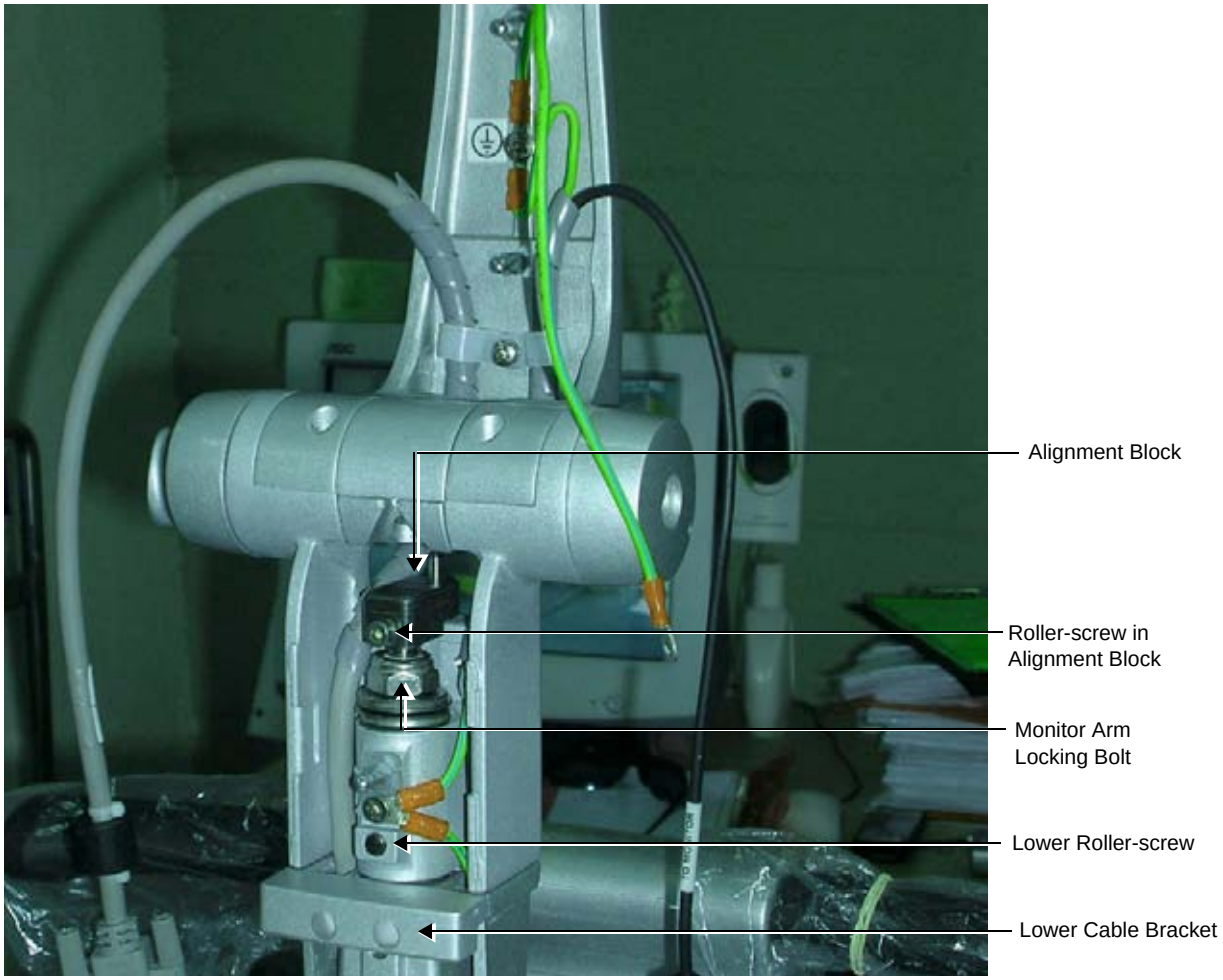


Figure 8-31 Monitor Arm and Work Area

3.) Remove the roller-screw from the Alignment Block - Figure 8-32.

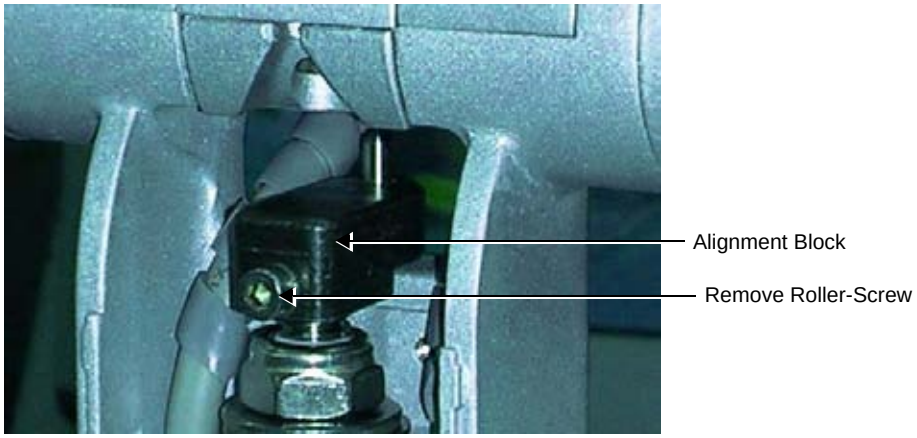


Figure 8-32 Roller-screw Located on the Alignment Block

4.) To remove the alignment block, first loosen the Monitor Arm locking bolt a few turns to create some freedom of movement for the Monitor Arm assembly so that it can be raised and lowered on the upper arm securing pin - Figure 8-33.
The object is to create sufficient space to remove the alignment block.

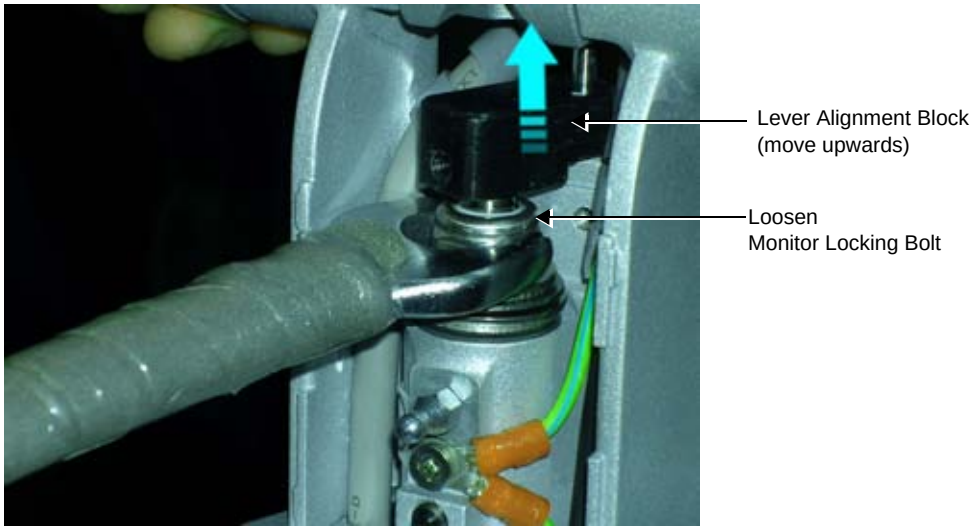


Figure 8-33 Monitor Arm Assembly Locking Bolt

5.) Using a flat screwdriver, lever the alignment block upwards so that it will slide away from the Monitor Arm securing pin - Figure 8-33. Remove the alignment block.

6.) Remove the Monitor Arm locking bolt from the Monitor Arm securing pin.

7.) Remove the four washers (carefully note the order of removal for easy replacement when assembling).

8.) Remove the lower Ground lead - Figure 8-33.

9.) Remove the lower cable bracket - Figure 8-34.

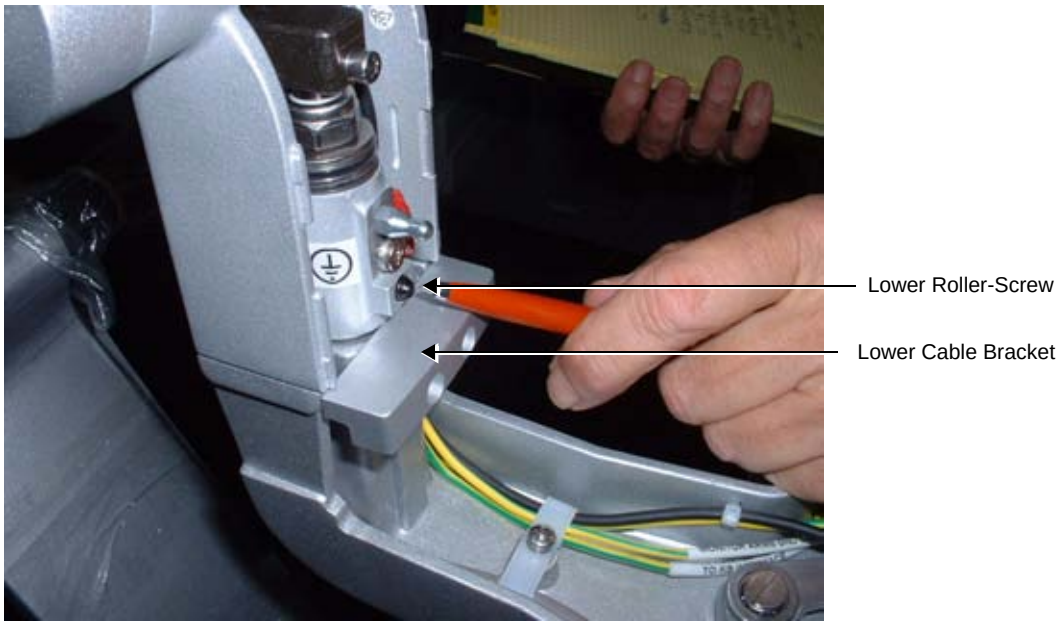


Figure 8-34 Lower Cable Bracket and Lower Roller-Screw

10.) Remove the lower roller-screw - Figure 8-34.

11.) Lift the Monitor arm up and away from the Monitor support Securing Pin - Figure 8-35.

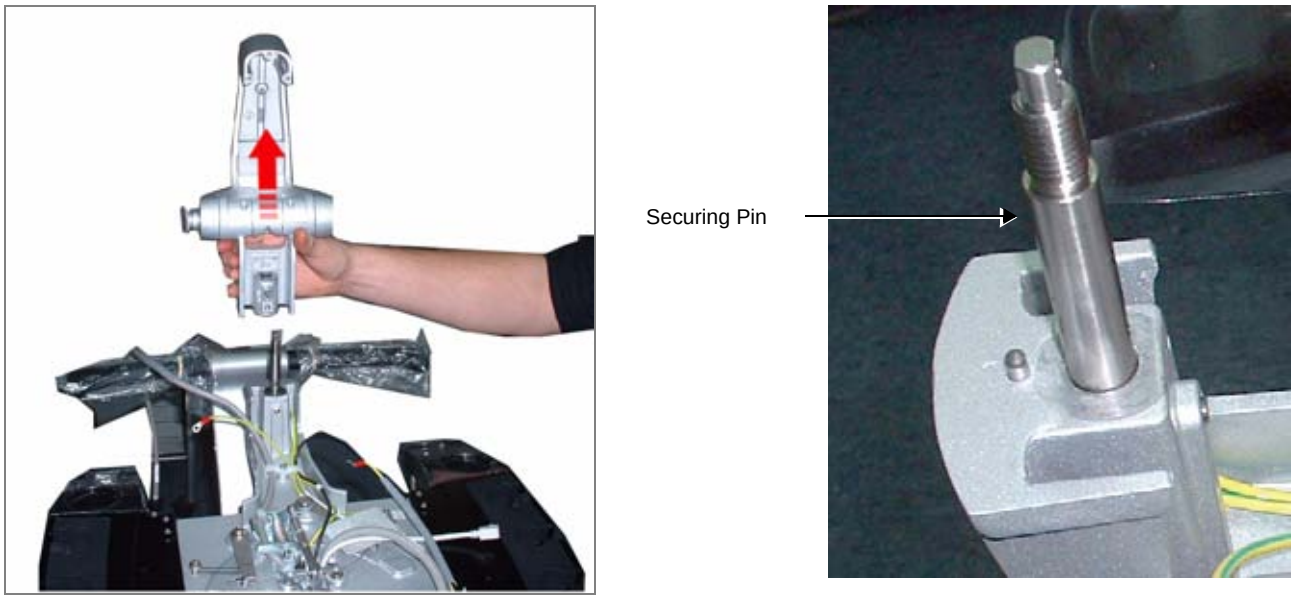


Figure 8-35 Monitor Arm and Securing Pin

8-3-2-4 Monitor Arm Installation Procedure

1.) Return the lower washer to its position on the securing pin - Figure 8-36.

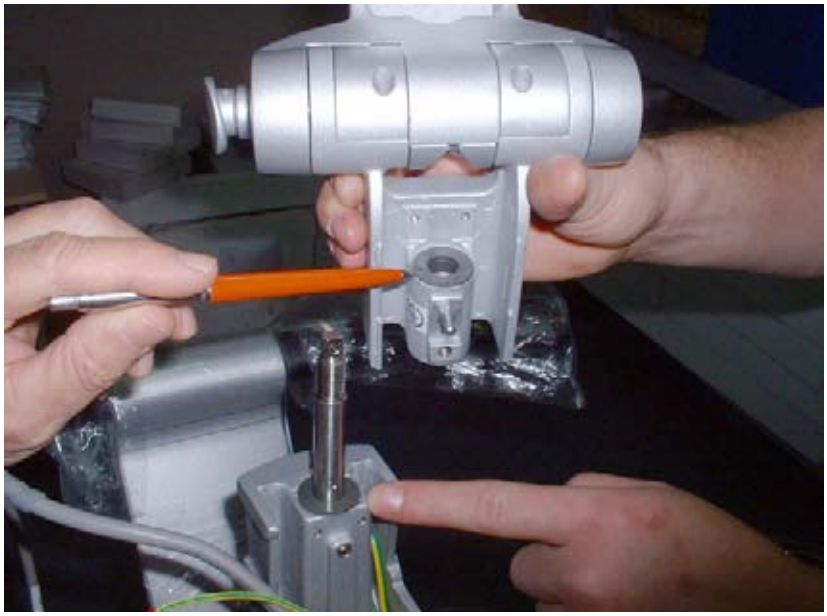


Figure 8-36 Positioning Upper and Lower Washers

2.) Position the monitor arm on the securing pin and return the upper washer to its position - refer to Figure 8-36.

3.) Place the spacer washers on the securing pin in the order shown in Figure 8-37 (right to left).

Figure 8-37 Spacer Washers

Note: Pay attention to the middle spacer-washer set - these are concave and must be placed as shown in Figure 8-38.

Figure 8-38 Middle Space Washer Set

4.) Return the Locking Bolt to its location on the securing pin and turn it a few turns only - Figure 8-39.

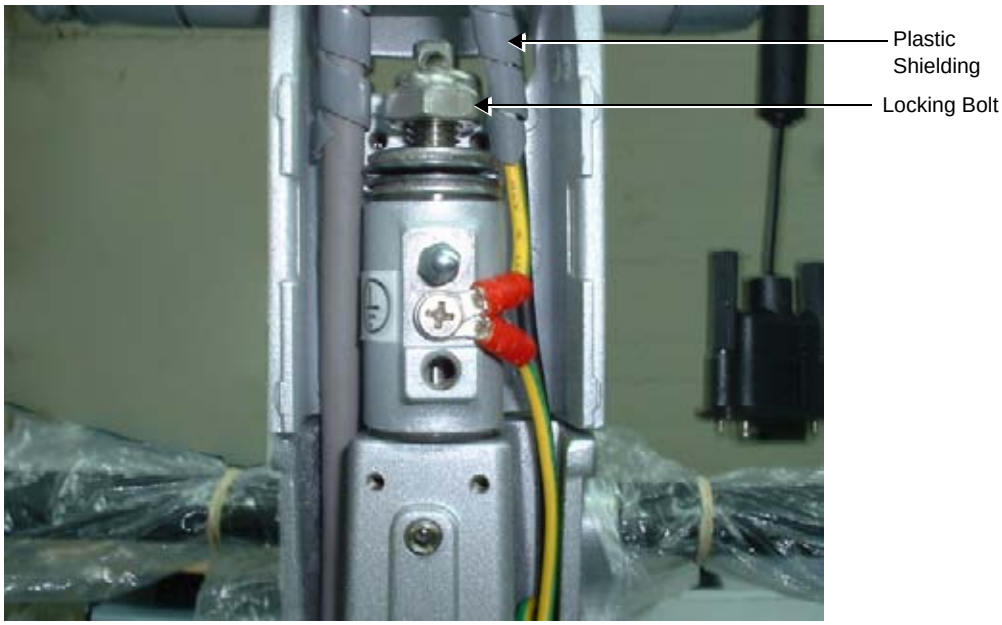


Figure 8-39 Securing Locking Bolt on Upper Arm Securing Pin

5.) Replace cables in their position on either side of the upper support arm as shown in Figure 8-39.

6.) Position the grey spiral plastic shielding - coiling the shielding as shown in Figure 8-39. Start the lower end of the spiral at the level of the washers on the support pin.

7.) Thread the cables through the aperture in the support arm in the following order:

- First, insert the black power cable
- Second, insert the DVI cable

8.) Return the cable holder bracket to its location on the upper arm - Figure 8-40.

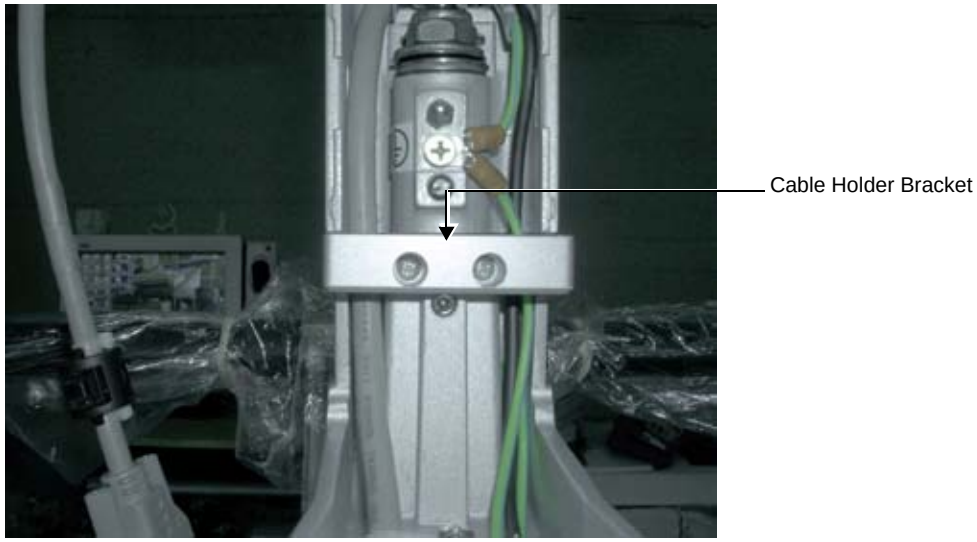


Figure 8-40 Cable Holder Bracket

9.) To return the alignment block to its position on the support pin, raise the support arm and insert the alignment block to its position above the securing bolt, see Figure 8-33.

10.) Tighten the securing bolt.

11.) Tap the alignment block *downwards* until it is firmly positioned on the securing pin - Figure 8-41.

Figure 8-41 Tapping the Alignment Block Downwards into Position

12.) Return the roller-screw to secure the Alignment Block - Figure 8-42 and return the lower roller-screw to its position.

Figure 8-42 Alignment Block showing Upper Roller Screw

13.) Reconnect the earth lead.

14.) Return the Upper Monitor Arm cover (previously removed) to its position on the Upper Monitor Arm.

15.) Return the Keyboard Assembly as described in the "Keyboard Assembly Installation Procedure" on page 8-40.

16.) Install the Monitor as described in the “Monitor Installation Procedure” on page 8-27.

17) Lower the console to the *maximum down* position.

18.) Turn ON power to the system.

19.) Proceed to perform the following functionality tests:

- “Grounding Continuity” on page 10-23
- “Chassis Current Leakage Test” on page 10-24
- “Monitor Movement Test” on page 4-34
- “Monitor Test” on page 4-21

20.) For the next stage of the Monitor Arm installation procedure, proceed to the instructions for Image Quality Calibration, as described in *Chapter 6 -* .

8-3-3 Monitor Cover Replacement Procedure

8-3-3-1 Tools

Use the appropriate flat and Phillips type screwdrivers and the appropriate Allen keys.

8-3-3-2 Preparation

Shut down the Vivid S5 N or Vivid S6 N ultrasound unit, as described in *Chapter 3 -* .

8-3-3-3 Monitor Cover Removal Procedure

8-3-3-4 Monitor Cover Removal Procedure

1) Remove the monitor, as described in "Monitor Removal Procedure" on page 8-24.
2) Place the monitor face down on a clean, object-free work surface.
3.) Remove the monitor rear cover by releasing 4 retaining screws and lifting the cover off the back of the monitor, as shown in Figure 8-43.

Figure 8-43 Lifting the Cover off the Rear of the Monitor

4.) Remove the LCD screen from its plastic frame by releasing 4 retaining screws around the perimeter of the screen - Figure 8-44.

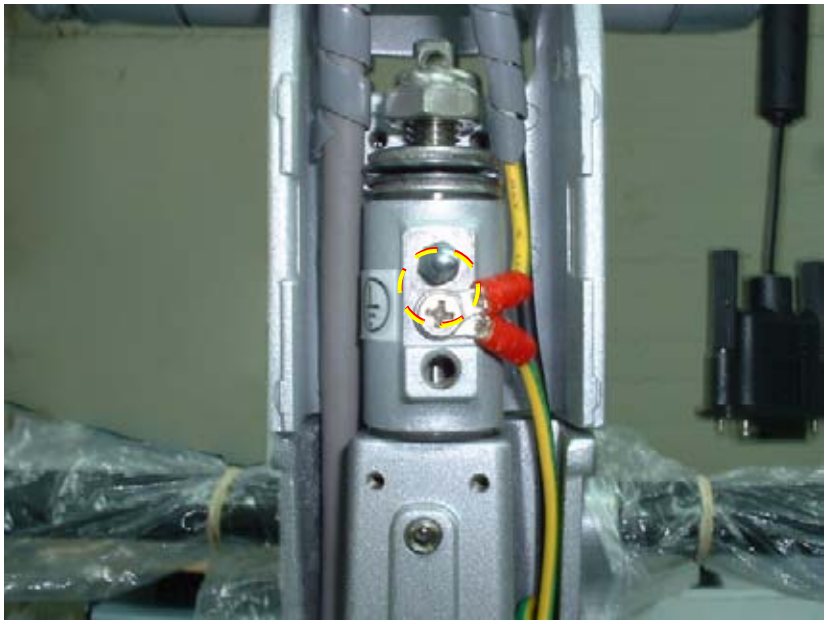


Figure 8-44 One of Four Retaining Screws around Perimeter of LCD Screen

5.) Lift the LCD screen *upwards* away from the frame.

Note: If not replacing the cover immediately, temporarily return the monitor to its position on the control console (refer to the appropriate steps in the "Monitor Installation Procedure" on page 8-27.

8-3-3-5 Monitor Cover Installation Procedure

1.) Carefully place the LCD screen face downwards in the new frame, then return the 4 retaining screws (previously removed) to secure the screen in the frame - refer to Figure 8-44.

2.) Place the new monitor rear cover in the correct position on the rear of the monitor and secure it in with the 4 retaining screws (previously removed) - refer to Figure 8-43 on page 8-35.

3.) Install the monitor on the control console, as described in the "Monitor Installation Procedure" on page 8-27.

4.) Adhere the appropriate Vivid S5 N or Vivid S6 N system label to the rear of the monitor.

5.) Proceed to perform the following functionality tests:

- "Grounding Continuity" on page 10-23
- "Chassis Current Leakage Test" on page 10-24
- "Monitor Movement Test" on page 4-34
- "Monitor Test" on page 4-21

6.) For the next stage of the monitor installation procedure, proceed to the instructions for Image Quality Calibration, as described in *Chapter 6 -* .

8-3-4 Keyboard Assembly Replacement Procedure

8-3-4-1 Tools

Use the appropriate flat and Phillips-type screwdrivers and the appropriate Hex wrench keys, as indicated in the keyboard assembly replacement procedure.

8-3-4-2 Preparation

Shut down the Vivid S5 N or Vivid S6 N ultrasound unit, as described in *Chapter 3* - System Setup.

8-3-4-3 Keyboard Assembly Removal Procedure

1) Working from the front of the system, raise the console to the *maximum up* position.
2) Make sure that the console is aligned in the central position (not pulled to one side or the other).
3) Working from beneath the keyboard assembly, loosen and remove the two Allen screws on the *right* side, as shown in Figure 8-45 below (arrows marked in the figure indicate the screw locations).

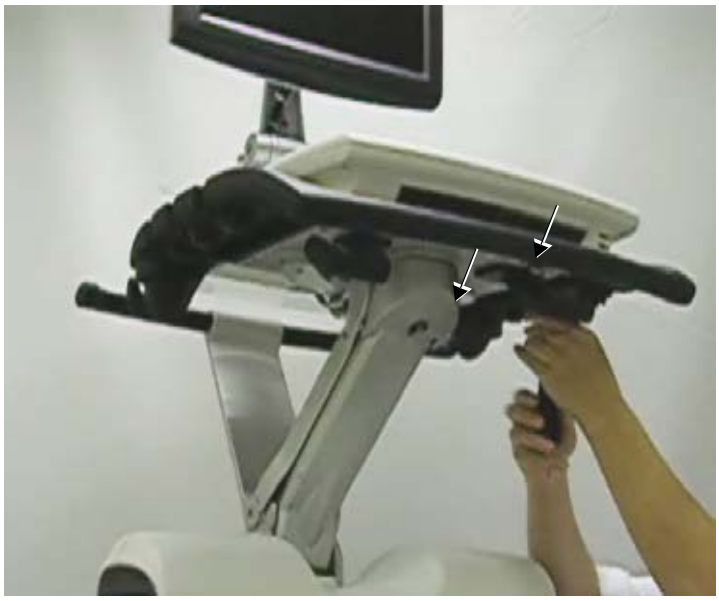


Figure 8-45 Removing the Allen Screws under Keyboard Assembly - Right Side

NOTE: Adjacent to each of the four Allen screws (two on the left; two on the right) there is an arrow marking the position of the screws for easy identification:

8-3-4 Keyboard Assembly Replacement Procedure (cont'd)

4) Loosen the two captive Allen screws on the *left* side, as shown in Figure 8-45 below (arrows marked in the figure indicate the screw locations).

Figure 8-46 Loosening the Captive Allen Screws under Keyboard Assembly - Left Side

5) If in current use, remove the basket from the keyboard interface column (refer to "Basket Removal Procedure" on page 8-19).

6) Tilt the keyboard assembly upwards, exposing the two cables connected to the keyboard assembly.

7) Unplug the USB cable as shown in Figure 8-45 below.

Figure 8-47 Disconnecting the USB Cable

8) Using a flat screwdriver, release the two tags that secure the Data cable in position - see Figure 8-48.

8-3-4 Keyboard Assembly Replacement Procedure (cont'd)

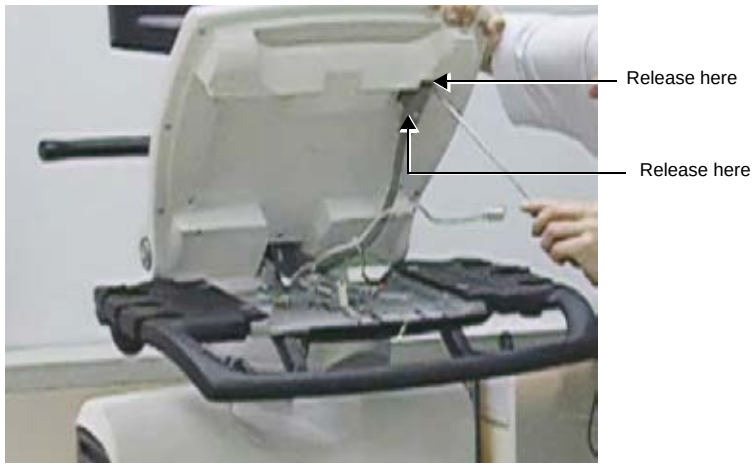


Figure 8-48 Releasing the Data Cable Securing Tags

9.) Unplug the Data cable, as shown in Figure 8-49.

Figure 8-49 Disconnecting the Data Cable

8-3-4 Keyboard Assembly Replacement Procedure (cont'd)

10) Lift the keyboard assembly *upwards* and remove it from the system.

Figure 8-50 Removing the Keyboard Assembly from the System

8-3-4-4 Keyboard Assembly Installation Procedure

1) Working from the front of the system, make sure the console is raised to the *maximum up* position.
2) Make sure that the console is aligned in the central position (not pulled to one side or the other).
3) Return the new keyboard assembly to the system gently lowering it into the correct position.
4) Tilt the keyboard assembly upwards, to expose the two cable connections underneath.
5.) Reconnect the Data cable - refer to Figure 8-49 on page 8-39.
6) Using a flat screwdriver, secure the Data cable in position under the two tags (previously released as shown in Figure 8-48 on page 8-39).
7) Reconnect the USB cable - refer to Figure 8-47 on page 8-38.
8) If used, return the basket to the keyboard interface column (refer to "Basket Installation Procedure" on page 8-19).
9) Working from beneath the keyboard assembly, fasten the two captive Allen screws (previously removed) on the *left* side, as shown in Figure 8-46 on page 8-38.
10) Fasten the two captive Allen screws on the *right* side - Figure 8-45 on page 8-37.
11) Lower the console to the *maximum down* position.
12.) Turn ON power to the system.

8-3-4 Keyboard Assembly Replacement Procedure (cont'd)

13.) Proceed to perform the following functionality tests:

- "Alphanumeric Keyboard Test" on page 4-17
- "Extended Keyboard and Trackball Test" on page 4-17
- "Speakers Tests" on page 4-20
- "Light Detector Test for Vivid S6 N only" on page 4-21
- "USB Test" on page 4-35
- "Grounding Continuity" on page 10-23
- "Chassis Current Leakage Test" on page 10-24

8-3-5 Keyboard Interface Assembly Replacement Procedure

8-3-5-1 Tools

Use the appropriate flat and Phillips type screwdrivers and the appropriate Allen keys.

8-3-5-2 Preparation

Shut down the Vivid S5 N or Vivid S6 N ultrasound unit, as described in *Chapter 3 -* .

8-3-5-3 Keyboard Interface Assembly Removal Procedure

NOTE: Figure 8-51 shows a general view of the Keyboard Interface Assembly work area.

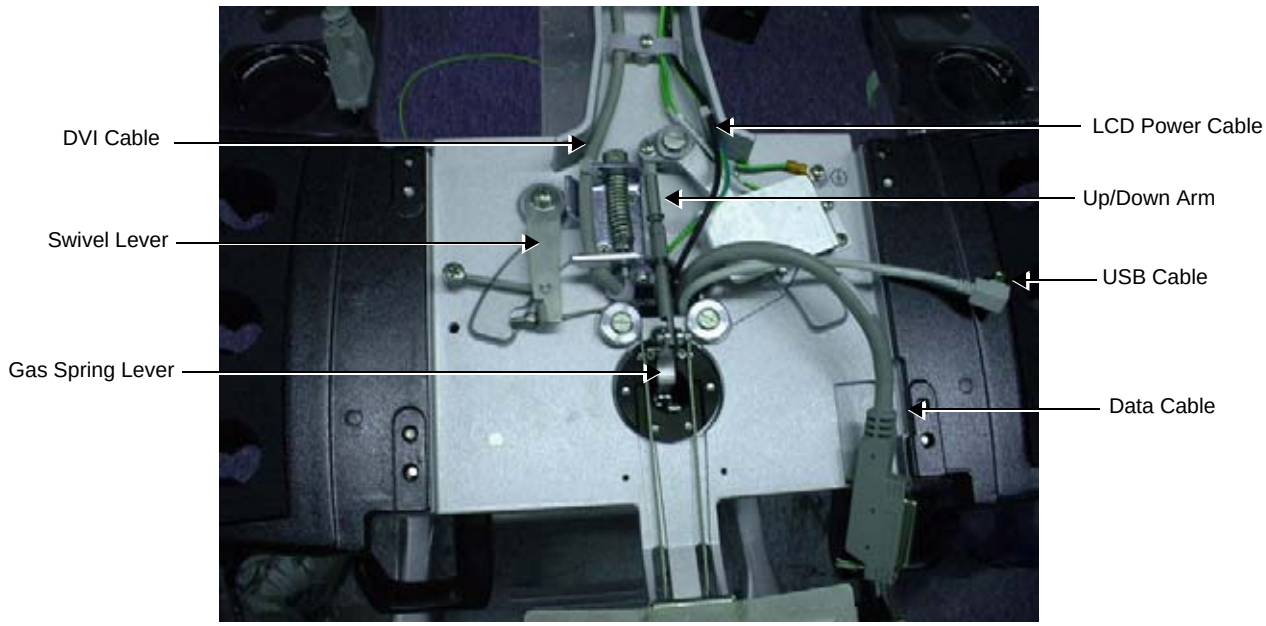


Figure 8-51 Keyboard Interface Assembly - General View of Work Area

1) Remove the Keyboard Assembly as described in the “Keyboard Assembly Removal Procedure” on page 8-37.
2) Remove the Probe shelf as described in the “Probe Shelf Removal Procedure” on page 8-50.

3.) Remove the DVI cable clip - be careful to hold the clip screw to prevent it from falling through the shaft - Figure 8-52.

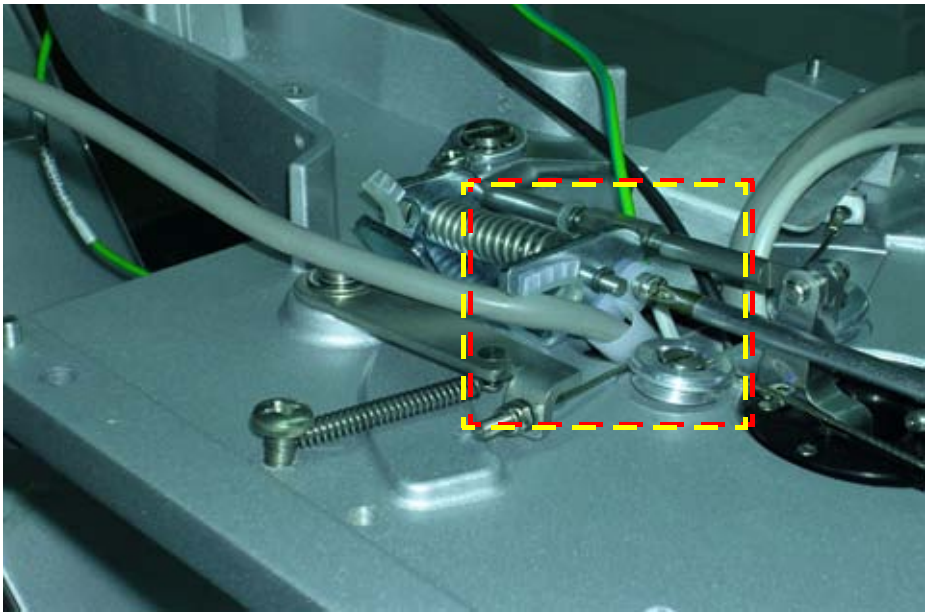


Figure 8-52 Removing the DVI Cable Holder

4.) Remove the Up-Down lever retaining screw (Figure 8-53), then disconnect the Up-Down lever from the Gas Spring lever as shown in Figure 8-54.

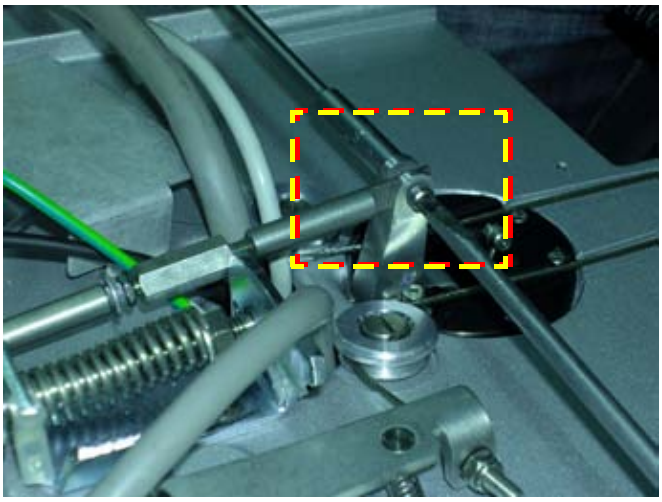


Figure 8-53 Up-Down Lever Retaining Screw

5.) Remove two brake lever retaining screws - Figure 8-54 and remove the Gas Spring lever.

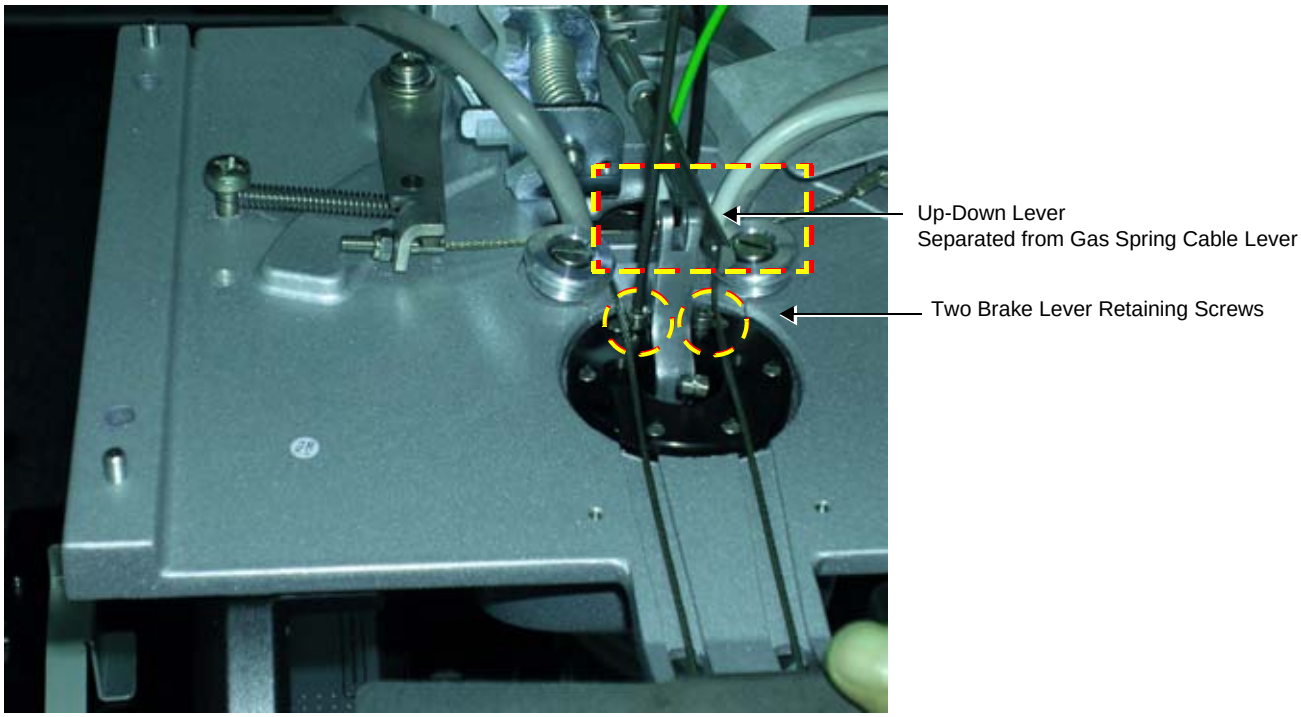


Figure 8-54 Up-Down Lever Separated from Gas Spring Cable Lever

6.) To release the Keyboard Interface Assembly from the lower support arm, unscrew the retaining bolt from below the Keyboard Interface Assembly using a box spanner - Figure 8-55.

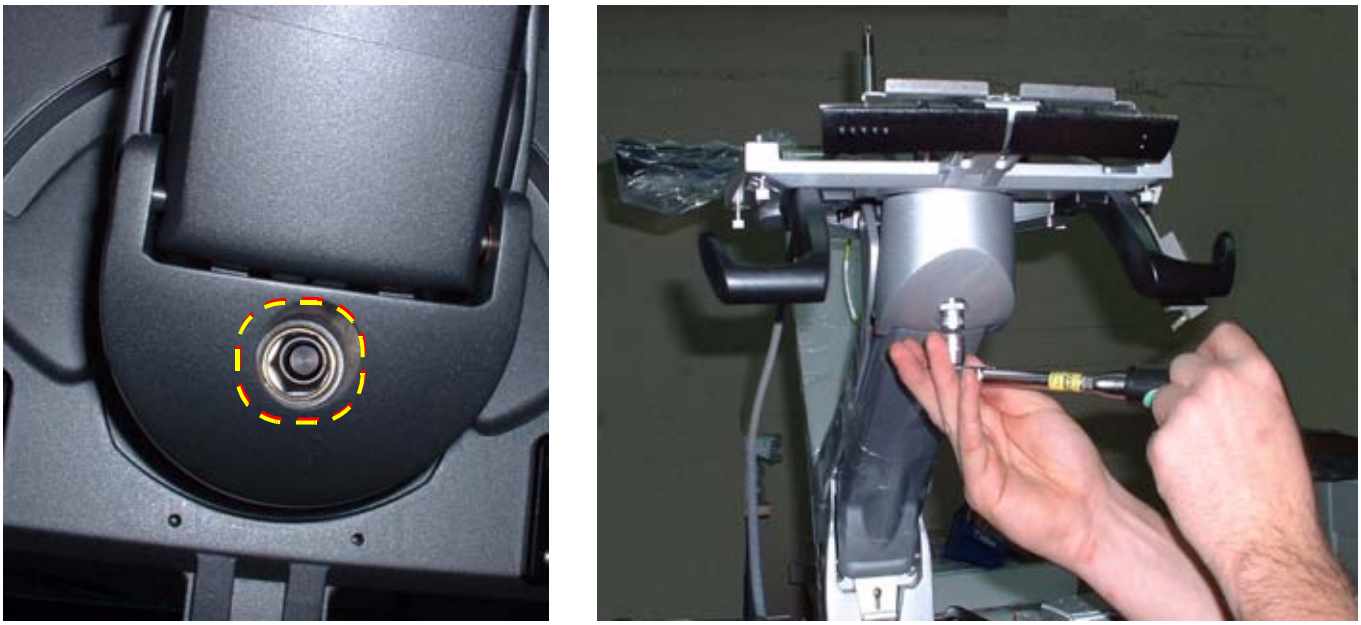


Figure 8-55 Keyboard Interface Assembly - Location of Retaining Bolt

7.) Holding the Keyboard Interface Assembly base with both hands and pressing the swivel lever inwards, gently turn the base from side to side while pulling upwards and away from the support arm.

8.) Carefully unthread the cables from the Key Board Interface Assembly.

8-3-5-4 Keyboard Interface Assembly Installation Procedure

NOTE: ***When returning the cables through the Keyboard Interface Assembly base, ensure that you thread the cables from the bottom side of the Keyboard Interface Assembly base through to the upper side.***

1.) Thread the cables **in the following order** through the aperture in the Keyboard Interface Assembly:

a.) Black power cable

b.) DVI cable

c.) All remaining cables

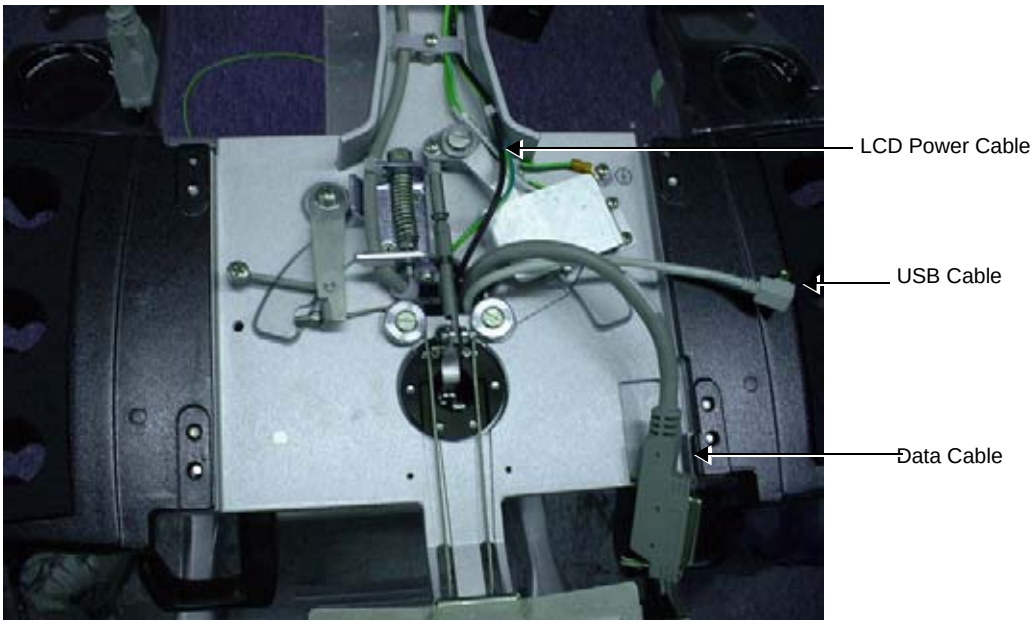


Figure 8-56 Keyboard Interface Assembly Showing Cables Exiting the Base From Below

2.) Position the Keyboard Interface Assembly on the Joint Assembly and thread the gas spring cable through the black Keyboard Interface Assembly cone and lower the assembly onto the joint.

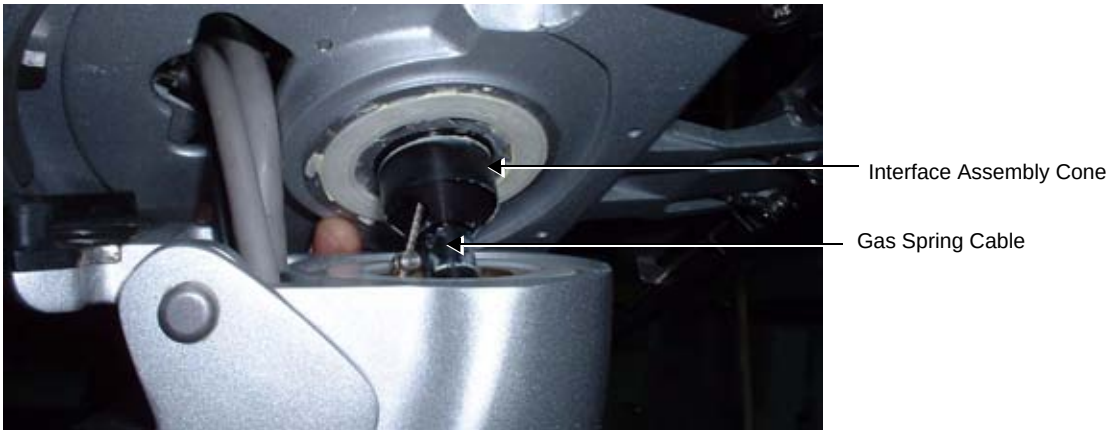


Figure 8-57 Keyboard Interface Assembly on the Joint Assembly

3.) From above the Keyboard Interface Assembly, push the swivel lever outwards as shown on the left in Figure 8-58, then push the Keyboard Interface Assembly firmly downwards onto the Joint Assembly as seen on the right in Figure 8-58.

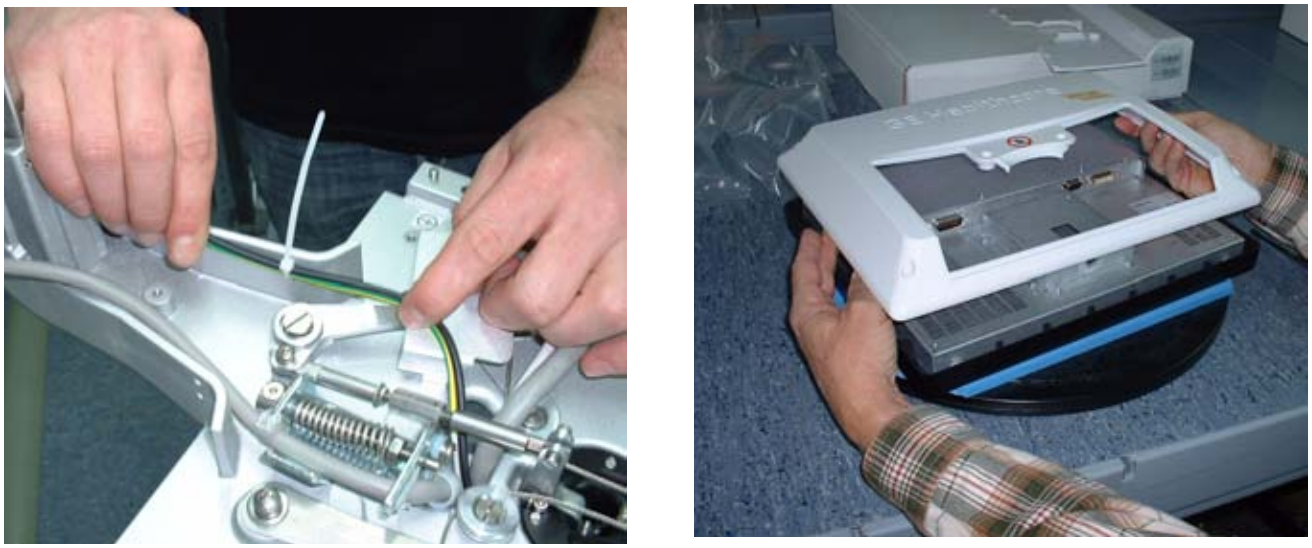


Figure 8-58 Keyboard Interface Assembly Positioned on Joint

4.) From below the Keyboard Interface Assembly base, return the securing bolt (see Figure 8-55) and tighten the bolt using a torque wrench to a pressure of 10 Nm.

5.) After tightening to 10 Nm, loosen the bolt by turning the torque wrench 1/4 of a turn.

6.) Return the gas spring cable lever to its position, hooking the gas spring cable lever onto the second notch on the gas spring cable - Figure 8-59.

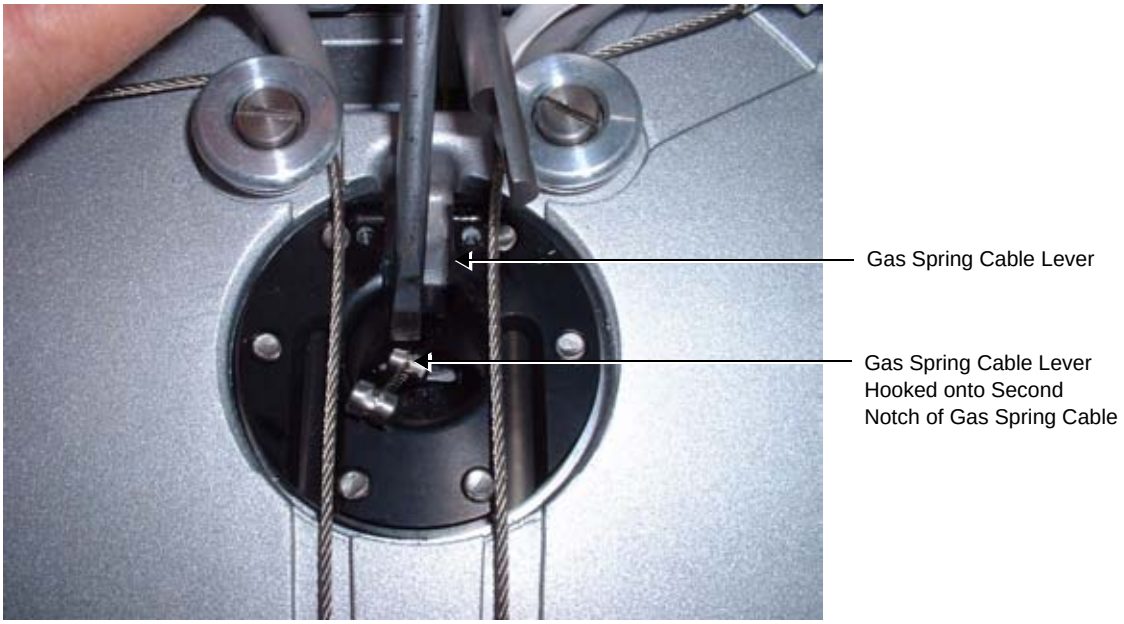


Figure 8-59 Attaching Gas Spring Cable Holder to Gas Spring Cable

7.) Return the cable holder lever pin to secure the cable holder and return the two securing screws to secure the cable holder in position - Figure 8-60.

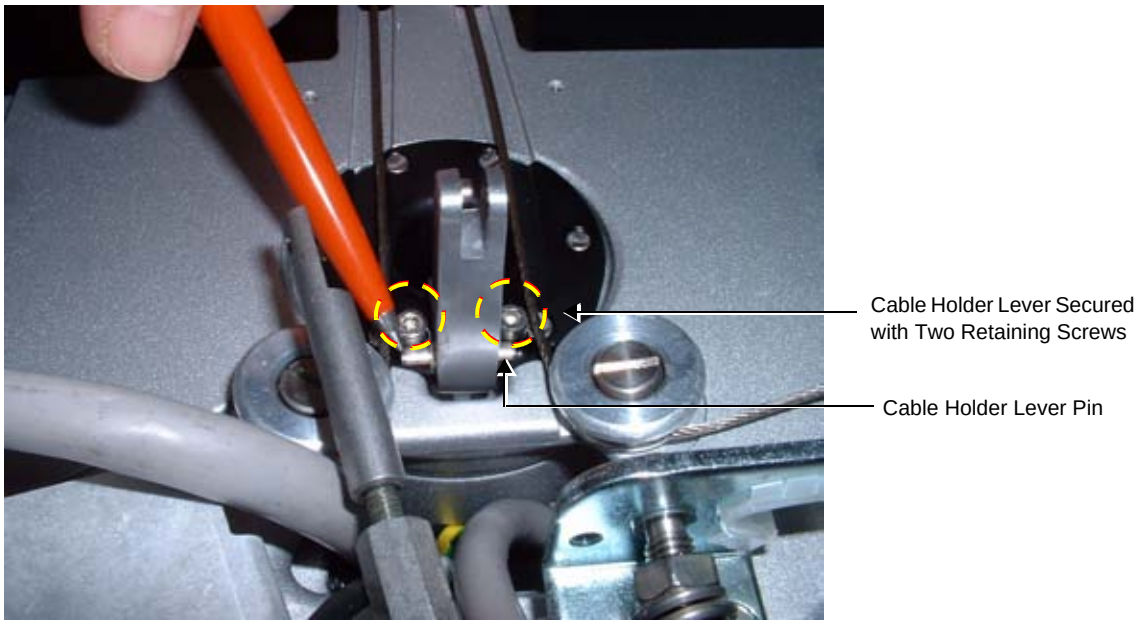


Figure 8-60 Cable Holder Lever Secured with Pin and Retaining Screws

8.) Attach the Up-Down Lever to the cable holder lever and fasten it with the retaining screw (see Figure 8-61).

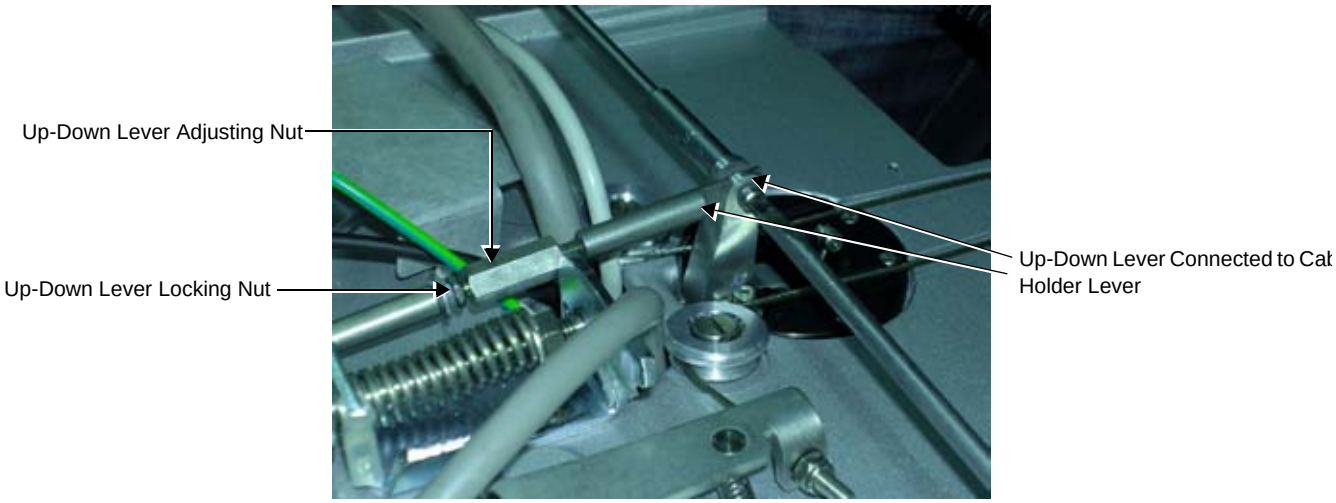


Figure 8-61 Up-Down Lever Connected to Cable Holder Lever

9.) Adjust the tension of the Up-Down Cables, as described in "Adjusting the Tension of the Up-Down Cables" on page 8-49, then proceed to step 10.

10.) Return the Probe shelf as described in the "Probe Shelf Installation Procedure" on page 8-50.

11.) Return the Keyboard Assembly as described in the "Keyboard Assembly Installation Procedure" on page 8-40.

12) Lower the console to the *maximum down* position.

13.) Turn ON power to the system.

14.) Check for proper up/down and side-to-side movement of the operator panel and monitor, as described in "Mechanical Functional Tests" on page 4-33.

15.) Proceed to perform the following functionality tests:

- "Grounding Continuity" on page 10-23
- "Chassis Current Leakage Test" on page 10-24

8-3-5-4-1 Adjusting the Tension of the Up-Down Cables

NOTE: The following procedure describes how to adjust the tension in the Up-Down Cable to enable raising and lowering of the Keyboard Interface base, using the SafeLock Cart height adjustment lever. The required adjustment is accomplished by "trial and error" until the correct cable tensions have been achieved.

1.) Rotate the Keyboard Interface base *clockwise* about a quarter of a turn.

2.) Gradually tighten the up-down lever adjusting nut until the Keyboard Interface base rises upwards on the support arm - Figure 8-61.

3.) Gradually loosen the up-down lever and while loosening it, press the Keyboard Interface base downwards. As the up-down lever is gradually loosened, it will become increasingly difficult to push the UI base downwards.
Once the base is completely stable, the optimum tension in the cables will have been achieved.

4.) Tighten the up-down lever locking nut to lock the up-down cable lever in the optimum position - Figure 8-61.

5.) Using the height adjustment lever (the lever on the right), check that it is possible to raise and lower the Keyboard Interface base and set it in various positions making sure that it locks firmly at each selection.

6.) Next, check that the Keyboard Interface base rotates freely from left to right and back, observing at the same time, that the communication cables are not stretched or put under any tension while doing this.

8-3-6 Probe Shelf Replacement Procedure

8-3-6-1 Tools

Use the appropriate screwdriver as indicated in the Probe Shelf Replacement procedure.

8-3-6-2 Preparation

Shut down the Vivid S5 N or Vivid S6 N ultrasound unit, as described in *Chapter 3* - System Setup.

8-3-6-3 Probe Shelf Removal Procedure

1) Remove the Keyboard Assembly as described in the “Keyboard Assembly Removal Procedure” on page 8-37.

2) Working from below, and while carefully supporting the Probe Shelf Holder, remove the 4 retaining screws - two on either side - as seen in Figure 8-62.

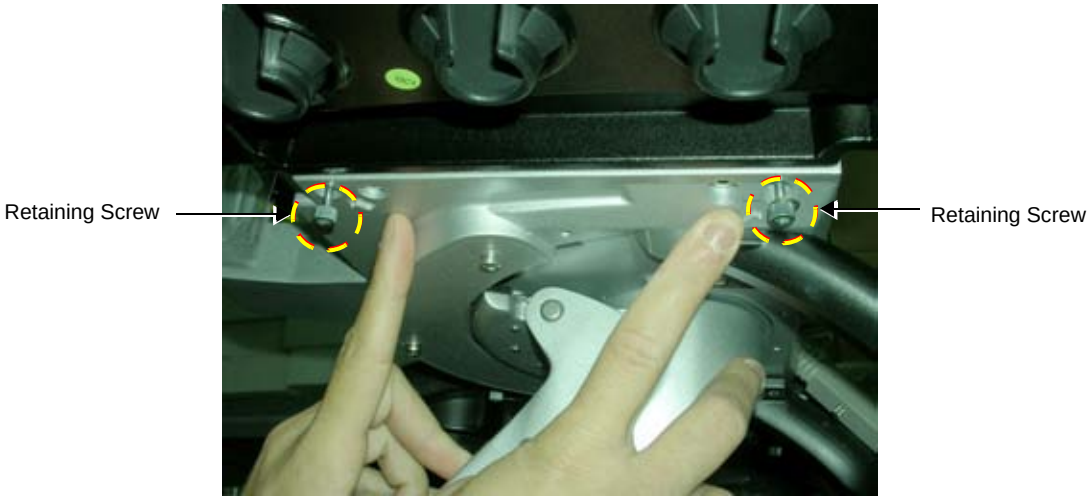


Figure 8-62 Probe Shelf - Viewed from Below indicating Retaining Screws

3.) Remove the Probe Shelf.

8-3-6-4 Probe Shelf Installation Procedure

1.) Return the Probe Shelf to its location on the Keyboard Interface Assembly and secure it with the 4 retaining screws (previously removed).

2.) Install the Keyboard Assembly as described in the “Keyboard Assembly Installation Procedure” on page 8-40.

3) Lower the console to the *maximum down* position.

4.) Turn ON power to the system.

5.) Check for proper up/down and side-to-side movement of the operator panel and monitor, as described in “Mechanical Functional Tests” on page 4-33.

6.) Proceed to perform the following functionality tests:

- “Grounding Continuity” on page 10-23
- “Chassis Current Leakage Test” on page 10-24

8-3-7 Swivel and Up-Down Handle Replacement Procedure

8-3-7-1 Tools

Flat and Phillips screwdrivers as needed.

8-3-7-2 Preparation

Shut down the Vivid S5 N or Vivid S6 N ultrasound unit, as described in *Chapter 3 -* .

8-3-7-3 Swivel and Up-Down Handle Replacement Procedure

1) Remove the Operator Panel as described in the "Keyboard Assembly Removal Procedure" on page 8-37.
2) Remove the Probe Shelf as described in the "Probe Shelf Removal Procedure" on page 8-50.
3.) Unscrew the protective metal plate (shown in Figure 8-63) and rotate it upwards 90 degrees.

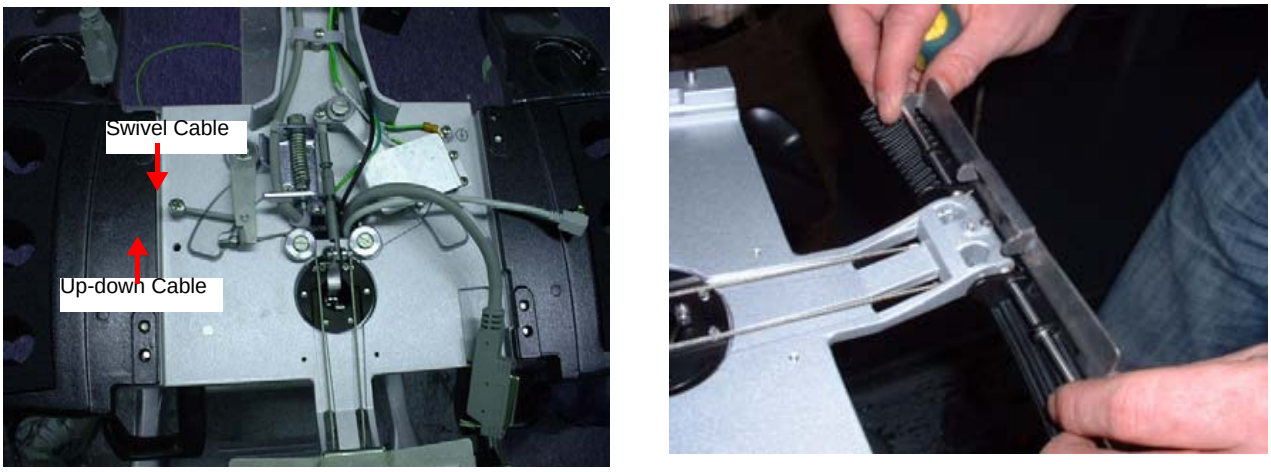


Figure 8-63 Protective Metal Plate Rotated 90 Degrees

4.) Remove the spring clips securing the particular handle to be removed - Figure 8-64.

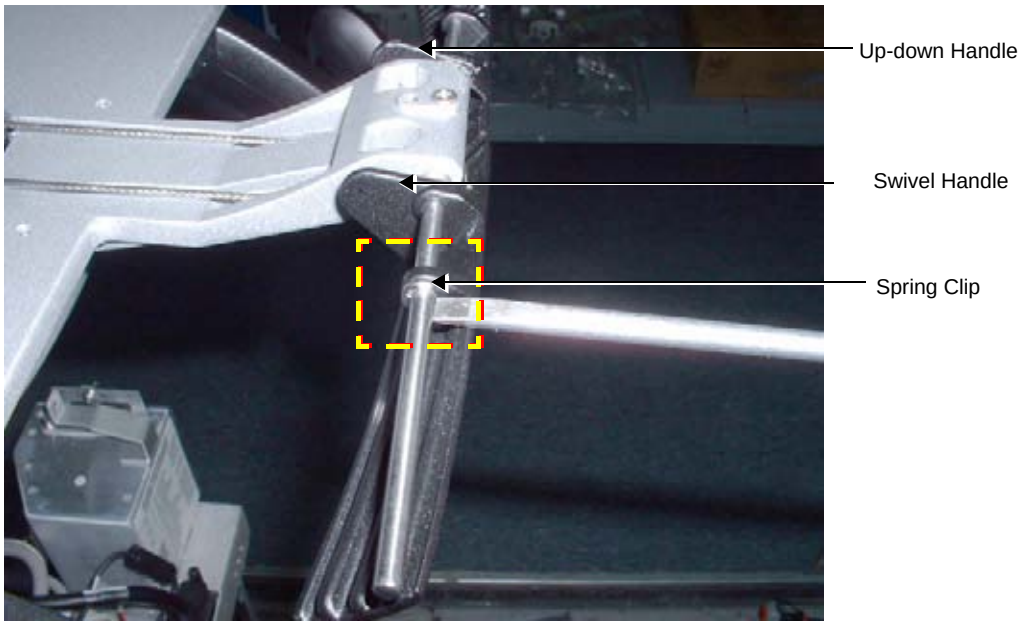


Figure 8-64 Removing Spring Clip that Secures the Swivel Handle

5.) Release the small spring that presses on the handle to be replaced - Figure 8-65.

Figure 8-65 Releasing Spring that Presses on the Handle

6.) Release the tension in the up-down/swivel cables by pressing the cable tension levers *inwards*.

7.) Disconnect the up-down/swivel cable from the handle to be replaced and slide the handle sideways to remove it from the supporting shaft - Figure 8-66.

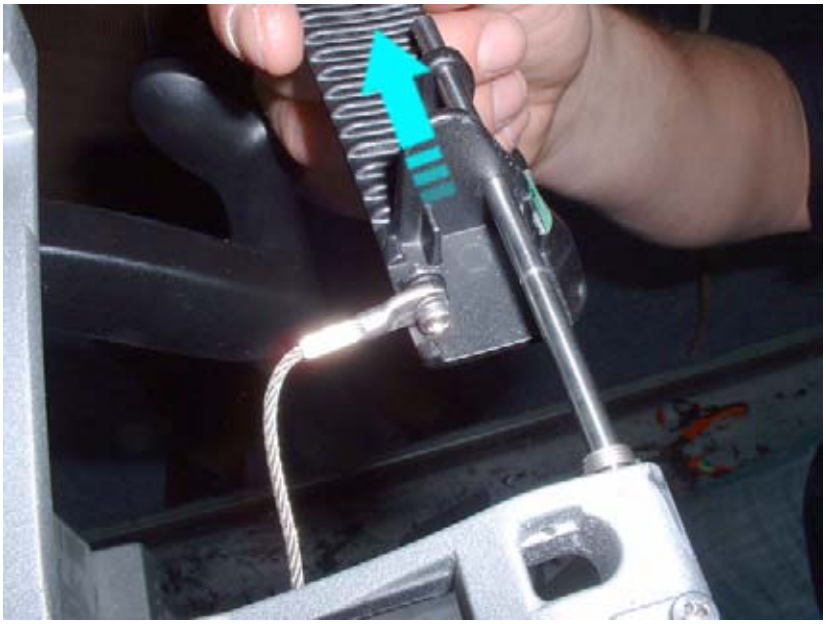


Figure 8-66 Release Cable and Slide Handle Sideways

8-3-7-4 Swivel and Up-Down Handle Installation Procedure

1.) Install the appropriate handle on the support shaft.
2.) Return spring/s and securing clip/s to secure the handle/s.
3.) Return the protective metal plate and secure it with the retaining screw (previously removed).
4) Install the Probe Shelf as described in the “Probe Shelf Installation Procedure” on page 8-50.
5.) Install the Operator Panel as described in the “Keyboard Assembly Installation Procedure” on page 8-40.
6) Lower the console to the *maximum down* position.
7.) Turn ON power to the system.
8.) Check for proper up/down and swivel movement of the handle, as described in “Mechanical Functional Tests” on page 4-33.

8-3-8 Rear Handle Replacement Procedure

8-3-8-1 Tools

- Appropriate cutting knife for cutting perspex as shown in Figure 8-67.
- RTV 102 Silicone Sealant, P/N USFS-43

Figure 8-67 Cutting Knife with Pointed Protruding Edge

8-3-8-2 Preparation

Shut down the Vivid S5 N or Vivid S6 N ultrasound unit, as described in *Chapter 3* - System Setup.

8-3-8-3 Rear Handle Removal Procedure

There are two types of rear handle removal procedure, as follows:

- On older-type Vivid S5 N or Vivid S6 N systems, the rear handles are glued to the aluminium bars and have to be cut and peeled off the aluminium bars to remove them.
  Refer to the instructions in Removing Handles Glued in Position.
- On newer Vivid S5 N or Vivid S6 N systems, the rear handles are secured with a mounting screw (see Figure 8-69). In this instance, the screw is released and the handle slides off the aluminium bar.
  Refer to the instructions in Removing Handles Secured with Mounting Screws.

8-3-8-3-1 Removing Handles Glued in Position

CAUTION **When removing the rear handles, do not use aggressive cleaning materials and do not use tools that impact or that might damage the aluminium handle bars.**

CAUTION **Use the cutting knife with care to avoid personal injury.**

1.) Using the knife, carefully cut 4 horizontal slits along the length of one of the rear handles and peel off the handle in strips along the slits that you cut - see Figure 8-68.

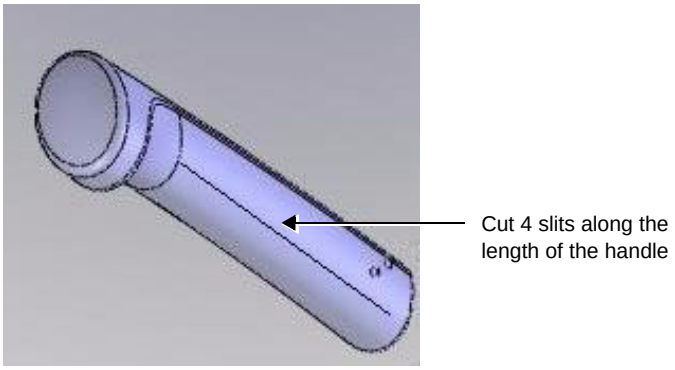


Figure 8-68 Slits Cut in Rear Handle (old-type system)

2.) Remove traces of the old handle and clean the aluminium bar with a suitable cloth.

3.) Repeat step 1 and step 2 to remove the second handle.

8-3-8-3-2 Removing Handles Secured with Mounting Screws

1.) Using the Socket Set Screw Flat Point, loosen and remove the mounting screw from one of the rear handles; remove the handle from the aluminium bar.

2.) Repeat step 1 to remove the second handle.

8-3-8-4 Rear Handle Installation Procedure

8-3-8-4-1 Installing Handles Glued in Position

NOTE: Identify the left and right rear handle before starting this procedure.

1.) Apply the RTV 102 silicone sealant to a few points along the aluminium bar.
2.) Slide the left handle onto the aluminium bar pushing it until it meets the aluminium T-joint.
3.) Repeat step 1 and step 2 to install the right handle.
4.) Allow the glue to dry overnight.
5.) Next morning, check that the handles are properly secured.

8-3-8-4-2 Installing Handles Secured with Mounting Screws

1.) Identify the left and right handle before starting the procedure.

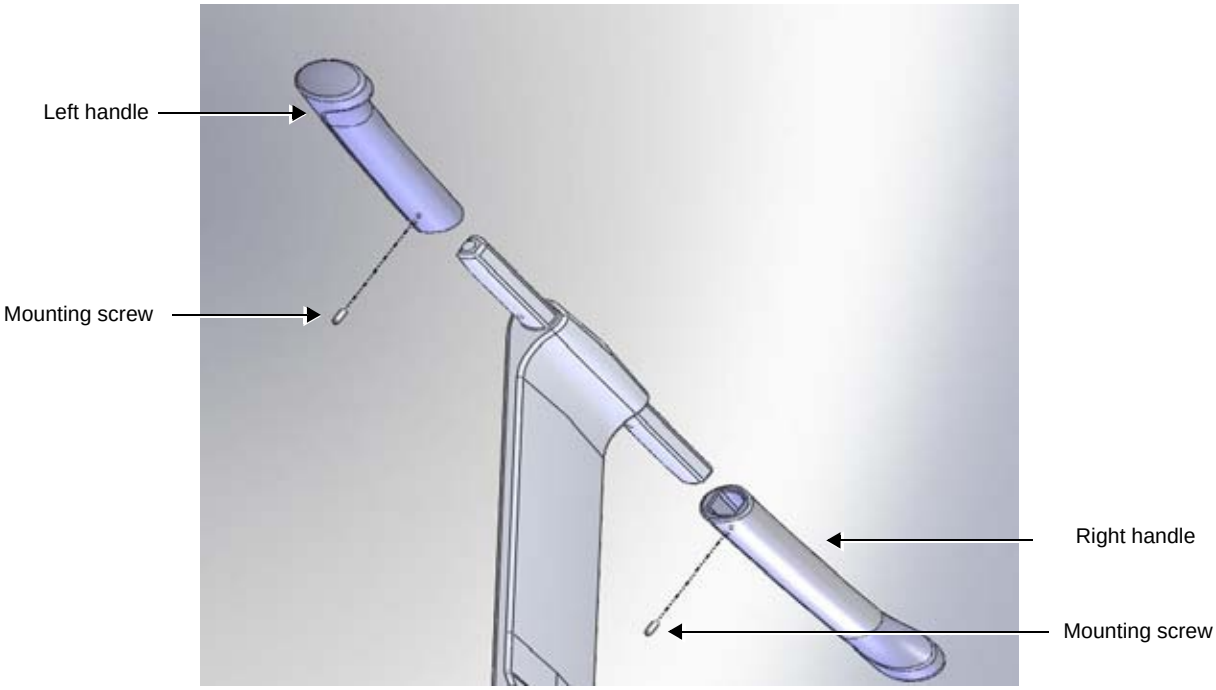


Figure 8-69 Exploded View Showing Rear Handles - (New-type System)

2.) Slide the left handle onto the aluminium support bar and then secure it by replacing the mounting screw (previously removed).
3.) Repeat step 2 to install the right handle.

Section 8-4
Keyboard Assembly Replacement Procedures

8-4-1 Keyboard Bottom Cover Replacement Procedure

CAUTION

When performing these procedures, take precautions to avoid damage of electrostatic-sensitive components. Always have the ESD wrist strap connected either to the DIB chassis or to the GND plug at the rear of the scanner, and to your hand.

If a battery is present, first remove the battery as it contains stored energy. Refer to "Battery Removal Procedure" on page 8-106.

8-4-1-1 Tools

Use the appropriate screwdriver, as indicated in the Keyboard Bottom Cover replacement procedure.

8-4-1-2 Preparation

Shut down the Vivid S5 N or Vivid S6 N ultrasound unit, as described in *Chapter 3* - System Setup.

8-4-1-3 Keyboard Bottom Cover Removal Procedure

1.) Remove the Keyboard Assembly, as described in the "Keyboard Assembly Removal Procedure" on page 8-37.

2.) Carefully place the Keyboard Assembly upside-down on a flat, clean, stable surface.

3.) Loosen and remove the 8 Phillips screws that secure the bottom cover in place - see Figure 8-70

Figure 8-70 Keyboard Bottom Cover Securing Screws

8-4-1 Keyboard Bottom Cover Replacement Procedure (cont'd)

4.) Disconnect the two USB cables from the side of the trackball (Figure 8-71).

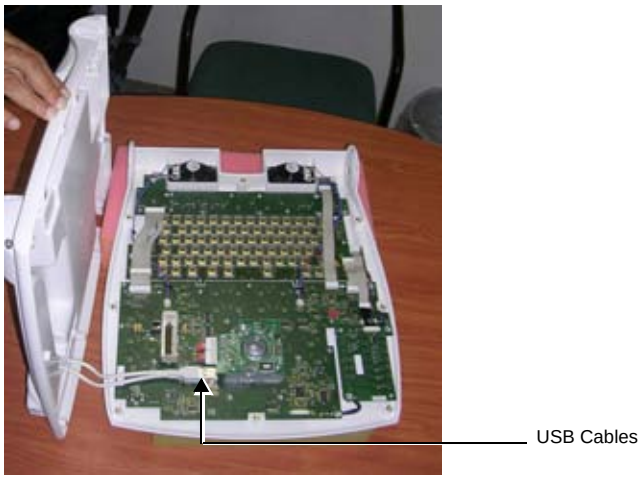


Figure 8-71 Location of USB Cables

5.) Remove the Keyboard Bottom Cover.

8-4-1-4 Keyboard Bottom Cover Installation Procedure

1.) Holding the Keyboard Bottom Cover close to the keyboard assembly (as shown in Figure 8-71 on page 8-58) carefully reconnect the two USB cables to the side of the trackball.

2.) Return and fasten the 8 Phillips screws (previously removed) to secure the bottom cover to the keyboard assembly - see Figure 8-70.

3.) Install the Keyboard Assembly on the system, as described in the "Keyboard Assembly Installation Procedure" on page 8-40.

4.) Proceed to perform the following functionality tests:

- "Alphanumeric Keyboard Test" on page 4-17
- "Extended Keyboard and Trackball Test" on page 4-17
- "Speakers Tests" on page 4-20
- "Light Detector Test for Vivid S6 N only" on page 4-21
- "USB Test" on page 4-35
- "Grounding Continuity" on page 10-23
- "Chassis Current Leakage Test" on page 10-24

8-4-2 Upper Arm Replacement Procedure

8-4-2-1 Tools

Use the appropriate flat and Phillips type screwdrivers and the appropriate Allen keys.

8-4-2-2 Preparation

Shut down the Vivid S5 N or Vivid S6 N ultrasound unit, as described in *Chapter 3 -* .

8-4-2-3 Upper Arm Removal Procedure

1) If the rear tray is attached to the SafeLock Cart, remove it before starting the procedure.
2) Remove the Monitor as described in the “Monitor Removal Procedure” on page 8-24.
3) Remove the Keyboard Interface Assembly as described in the “Keyboard Interface Assembly Removal Procedure” on page 8-42.
4.) Remove the Lower Arm Assembly as described in the “Lower Arm Removal Procedure” on page 8-163.
5.) Remove the Joint Assembly as described in the “Joint Assembly Removal Procedure” on page 8-64.
6.) Remove the Gas Spring as described in the “Gas Spring Removal Procedure” on page 8-169.
7.) Remove the cables from the Upper Arm.
8.) Release the locking screw securing the Upper Arm support pin as shown in Figure 8-72.

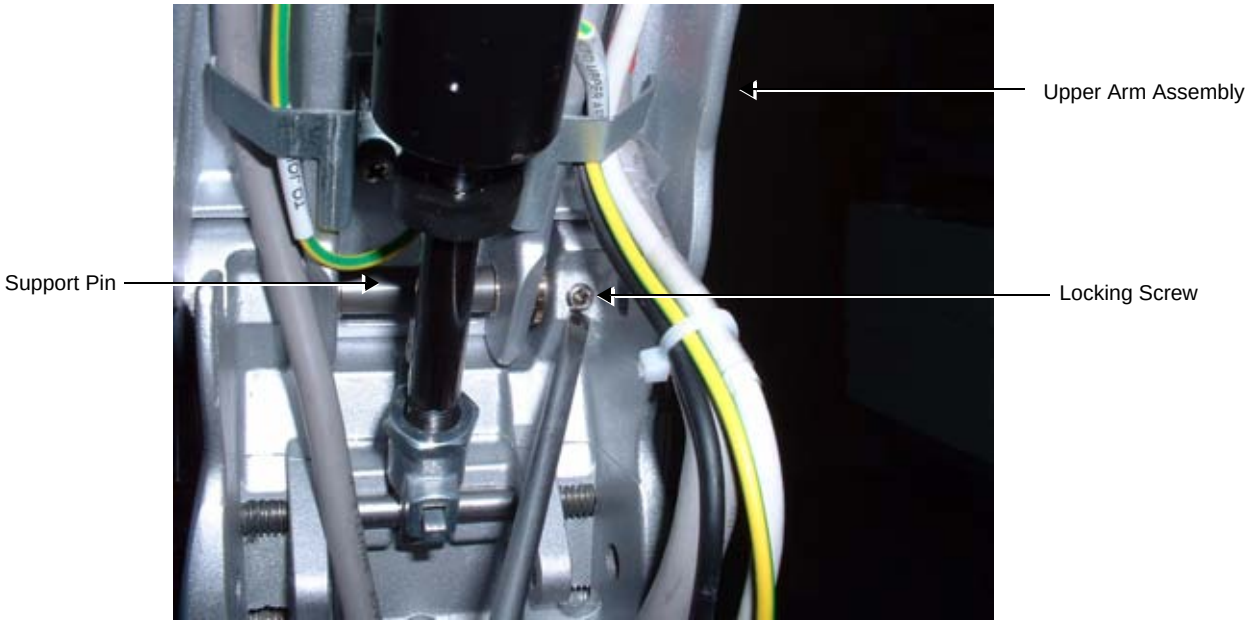


Figure 8-72 Locking Screw Securing Support Pin on Lower Section of Upper Arm

9.) Using a screwdriver, tap out the support pin - Figure 8-73 on page 8-60.

Figure 8-73 Tapping Out the Upper Arm Support Pin

10.) Remove the Upper Arm.

8-4-2-4 Upper Arm Installation Procedure

NOTE: Before installing the Upper Arm, care must be taken when restoring the cables to the Upper Arm assembly. The cables must protrude on either side of the Upper Arm in a specified manner as described below. Also, the cable length on either side of the Upper Arm is specific for the Vivid S5 N and Vivid S6 N system, respectively.

Cable Length Instructions - Vivid S5 N Systems

- In the direction of the DIB: both the DVI and the Power Monitor-to-Distribution cables protrude 42 cm beyond the end of the Upper Arm - refer to Figure 8-75.
- In the direction of the LCD: the Keyboard Data-to-Distribution cable protrudes 27.5 cm (Figure 8-74); the USB Keyboard-to-Distribution cable protrudes 21 cm (not shown).

Figure 8-74 Vivid S5 N Monitor Cable Protrudes 27.5 cm from End of Upper Arm

Figure 8-75 Protrusion of Vivid S5 N and Vivid S6 N Cables (42 cm and 37 cm, respectively)

Cable Length Instructions - Vivid S6 N Systems

- In the direction of the DIB: both the DVI and the Power Monitor-to-Distribution cables protrude 37 cm beyond the end of the Upper Arm - refer to Figure 8-75.
- In the direction of the LCD: the Keyboard Data-to-Distribution cable protrudes 27.5 cm (Figure 8-74); the USB Keyboard-to-Distribution cable protrudes 21 cm (not shown).

Installation Procedure - Vivid S5 N and Vivid S6 N Systems

1.) Prepare the required cable lengths for installation in the Upper Arm, as described above.
2.) Install the cables in the Upper arm securing them with the appropriate cable holders and clips - see Figure 8-75.

Figure 8-76 Positioning of Cable in Upper Arm

3.) Position the upper Arm in its location on the central column and insert the supporting pin as shown in Figure 8-72 on page 8-59.
4.) Secure the supporting pin with the locking screw as shown in Figure 8-72 on page 8-59.
5.) Install the Gas Spring as described in the "Gas Spring Installation Procedure" on page 8-172.
6.) Install the Joint Assembly as described in the "Joint Assembly Installation Procedure" on page 8-66.
7.) Install the Lower Arm Assembly as described in the "Lower Arm Installation Procedure" on page 8-167.
8) Install the Keyboard Interface Assembly as described in the "Keyboard Interface Assembly Removal Procedure" on page 8-42.
9.) Install the Monitor as described in the "Monitor Removal Procedure" on page 8-24.
10.) Install the Rear Tray, if applicable.
11) Lower the console to the *maximum down* position.

12.) Turn ON power to the system.

13.) Proceed to perform the following functionality tests:

- “Arm Movement Test” on page 4-33
- “Grounding Continuity” on page 10-23
- “Chassis Current Leakage Test” on page 10-24

8-4-3 Joint Assembly Replacement Procedure

8-4-3-1 Tools

Use the appropriate flat and Phillips type screwdrivers and the appropriate Allen keys.

8-4-3-2 Preparation

Shut down the Vivid S5 N or Vivid S6 N ultrasound unit, as described in *Chapter 3 -* .

8-4-3-3 Joint Assembly Removal Procedure

1) Remove the Monitor as described in the “Monitor Removal Procedure” on page 8-24.
2.) Remove the Keyboard Assembly as described in the “Keyboard Assembly Removal Procedure” on page 8-37
3) Remove the Probe shelf as described in the “Probe Shelf Removal Procedure” on page 8-50.
4.) Remove the Lower Arm as described in the “Lower Arm Removal Procedure” on page 8-163.
5.) Remove the Keyboard Interface Assembly as described in the “Keyboard Interface Assembly Removal Procedure” on page 8-42.
6.) If the rear tray is attached to the SafeLock Cart, remove it.
7.) Dismantle the Upper Gas Spring Cable Assembly by removing the two securing screws and bracket - Figure 8-77.

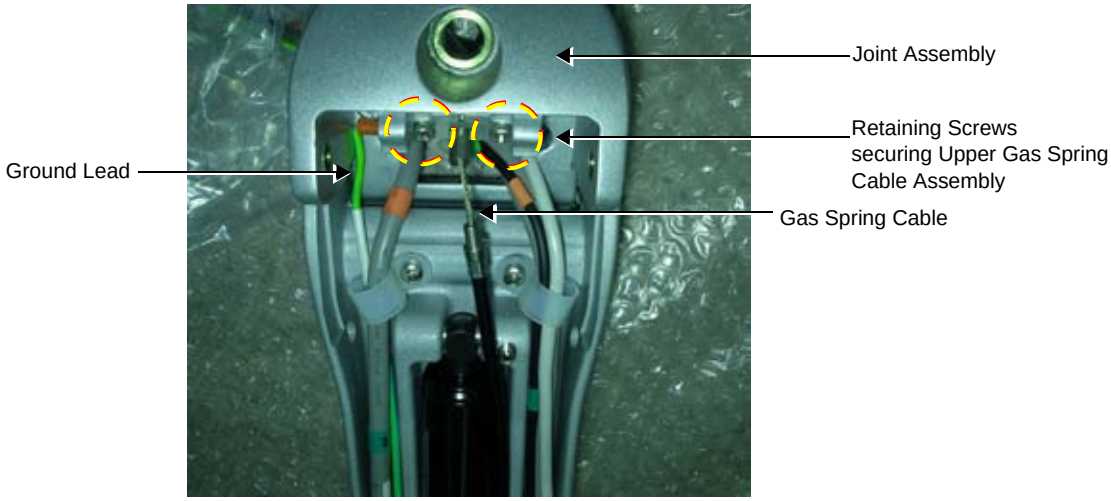


Figure 8-77 Dismantling the Upper Gas Spring Cable Assembly

8.) Disconnect the Ground lead.

9.) Release the two locking screws that secure the two Joint Assembly supporting pins - Figure 8-78.

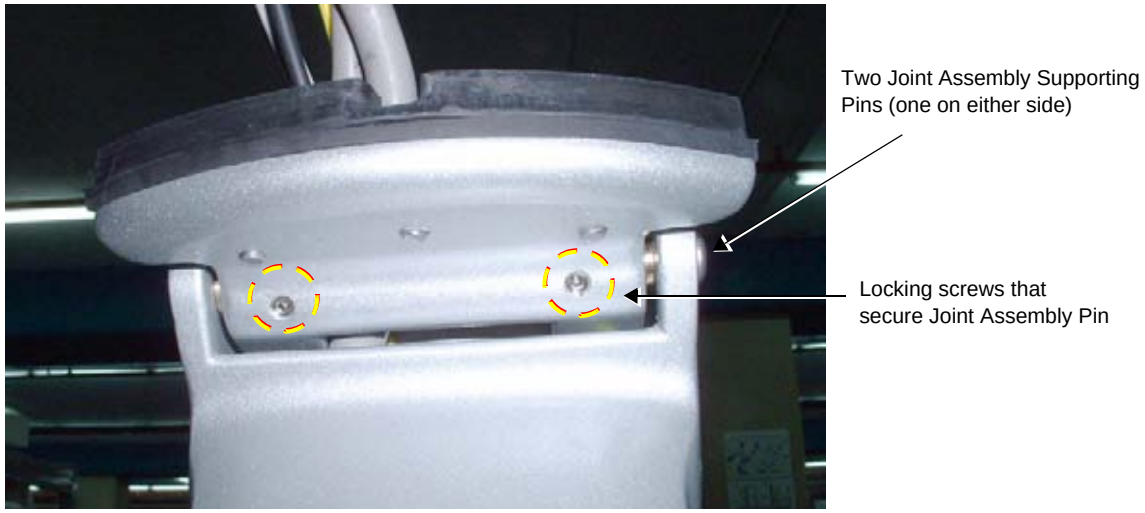


Figure 8-78 Locking Screws Securing the Joint Assembly Supporting Pins

10.) Release the ring clips securing the supporting pins - Figure 8-79.

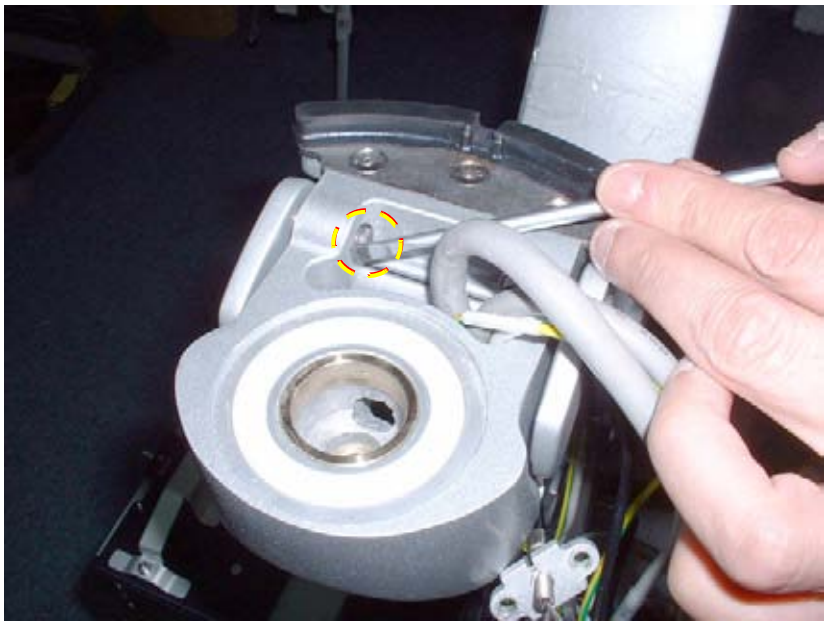


Figure 8-79 Ring Clips Securing Supporting Pins

11.) Using a screwdriver, tap out the supporting pins to release the Joint Assembly - Figure 8-80.

Figure 8-80 Removing the Joint Assembly

12.) Release the communication cables from the arm.

13.) Remove the cables by passing them through the Joint Assembly aperture.

14.) Remove the Joint Assembly.

8-4-3-4 Joint Assembly Installation Procedure

1.) Return the Joint Assembly to its location on the Upper Arm and insert the supporting pins.

2.) Secure the support pins by tightening the two locking screws - Figure 8-78.

3.) Return the ring clips to their positions on the supporting pins.

4.) Return the communication cables by passing them through the Joint Assembly aperture.

5.) Return the gas spring cable to its position (see Figure 8-77) with its bracket - the slot in the bracket must face upwards - Figure 8-81.

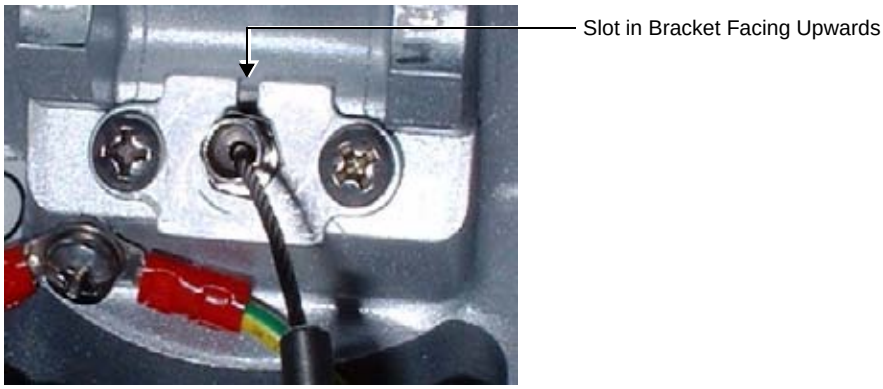


Figure 8-81 Gas Spring Cable Bracket showing Cable Slot

6.) Reconnect the Ground lead.

7.) Return the Keyboard Interface Assembly to its position as described in the “Keyboard Interface Assembly Installation Procedure” on page 8-45.

8.) Install the Lower Arm as described in the “Lower Arm Installation Procedure” on page 8-167.

9.) Install the Probe Shelf as described in the “Probe Shelf Installation Procedure” on page 8-50

10.) Install the Keyboard Assembly as described in the “Keyboard Assembly Installation Procedure” on page 8-40.

8-4-4 Alphanumeric Keyboard Replacement Procedure

CAUTION

When performing these procedures, take precautions to avoid damage of electrostatic-sensitive components. Always have the ESD wrist strap connected either to the DIB chassis or to the GND plug at the rear of the scanner, and to your hand.

If a battery is present, first remove the battery as it contains stored energy. Refer to "Battery Removal Procedure" on page 8-106.

8-4-4-1 Tools

Use the appropriate flat screwdriver and T10 torx screwdriver (T8 may also be used), as indicated in the Alphanumeric Keyboard replacement procedure.

8-4-4-2 Preparation

Shut down the Vivid S5 N or Vivid S6 N ultrasound unit, as described in *Chapter 3* - System Setup.

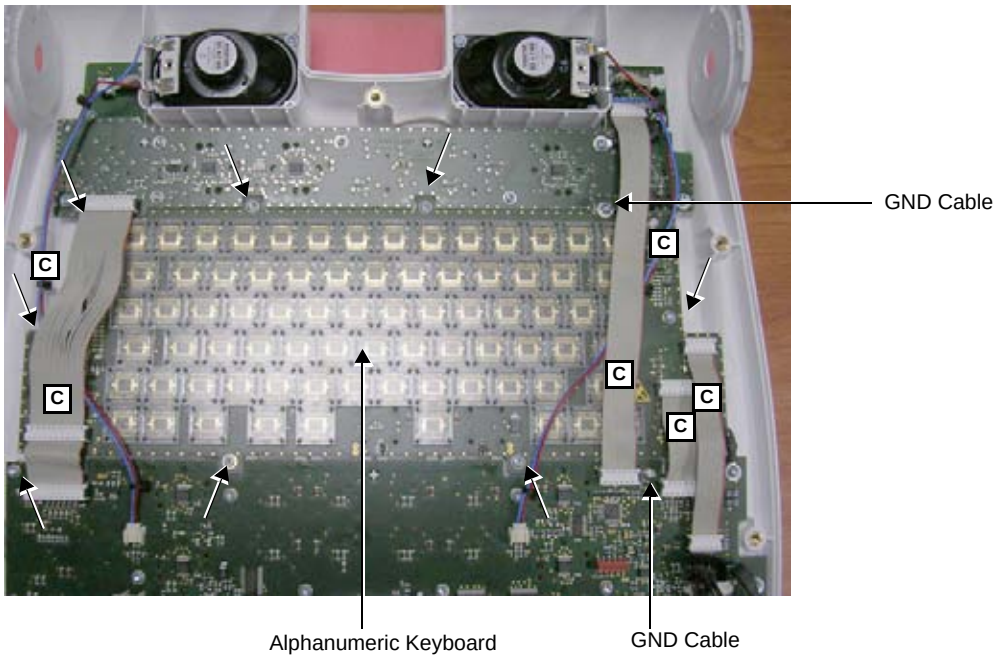
8-4-4-3 Alphanumeric Keyboard Removal Procedure

1.) Remove the Keyboard Assembly, as described in the "Keyboard Assembly Removal Procedure" on page 8-37.

2.) Carefully place the Keyboard Assembly upside-down on a flat, clean, stable surface.

3.) Remove the Keyboard Bottom Cover, as described in the "Keyboard Bottom Cover Removal Procedure" on page 8-57.

4.) Loosen the securing screw from each of the two GND cables and release the cables (see Figure 8-82).



Note: C = cable to be disconnected

Figure 8-82 Removing the Alphanumeric Keyboard

8-4-4 Alphanumeric Keyboard Replacement Procedure (cont'd)

NOTE: When performing the next step, for ribbon cable connectors place a flat screwdriver into the gap beneath the connector, as shown in the example in Figure 8-83.

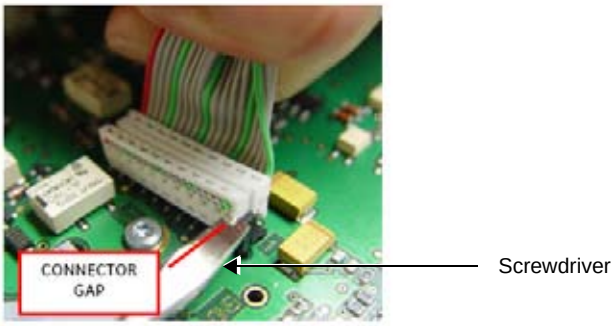


Figure 8-83 Releasing the Ribbon Cable Connector

5.) Disconnect the six cables, as indicated in Figure 8-82.

6.) Loosen and remove the eight star-shape screws that fasten the Alphanumeric Keyboard in position, as indicated in Figure 8-82.

7.) Remove the Alphanumeric Keyboard from the Keyboard Assembly.

8-4-4-4 Alphanumeric Keyboard Installation Procedure

1.) Carefully place the new Alphanumeric Keyboard in the keyboard assembly (refer to Figure 8-82 on page 8-67). Make sure it is correctly positioned.

2.) Return and fasten the eight star-shape screws (previously removed) to secure the Alphanumeric Keyboard firmly in position, as indicated in Figure 8-82.

3.) Carefully re-connect the six cables, as indicated in Figure 8-82.

4.) Fasten the two GND cables (see Figure 8-82).

5.) Re-fit the Keyboard Bottom Cover, as described in the "Keyboard Bottom Cover Installation Procedure" on page 8-58.

6.) Install the Keyboard Assembly on the system, as described in the "Keyboard Assembly Installation Procedure" on page 8-40.

7.) Proceed to perform the following functionality tests:

- "Alphanumeric Keyboard Test" on page 4-17
- "Extended Keyboard and Trackball Test" on page 4-17
- "Speakers Tests" on page 4-20
- "Light Detector Test for Vivid S6 N only" on page 4-21
- "USB Test" on page 4-35
- "Grounding Continuity" on page 10-23
- "Chassis Current Leakage Test" on page 10-24

8-4-5 Trackball Board Replacement Procedure

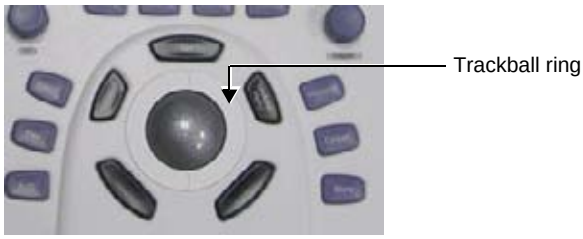
CAUTION

When performing these procedures, take precautions to avoid damage of electrostatic-sensitive components. Always have the ESD wrist strap connected either to the DIB chassis or to the GND plug at the rear of the scanner, and to your hand.

If a battery is present, first remove the battery as it contains stored energy. Refer to “Battery Removal Procedure” on page 8-106.

NOTE: Before performing this procedure, clean the trackball and bowl (since dirt may be the cause of the current fault). See below.

1.) Turn the trackball ring to loosen and remove it.



2.) Lift out the trackball.
3.) Wipe the bowl clean using a **lint-free** cloth and isopropyl alcohol.
4.) Place the trackball back in the bowl and fasten securely with the trackball ring.
5.) Check to ascertain if fault persists.

8-4-5-1 Tools

Use the appropriate screwdriver, as indicated in the Trackball Board replacement procedure.

8-4-5-2 Preparation

Shut down the Vivid S5 N or Vivid S6 N ultrasound unit, as described in *Chapter 3* - System Setup.

NOTE: Before performing this procedure, observe the current trackball speed setting. After completion of the installation procedure, the same trackball speed setting will be required. This is set using the procedure described in 6-1-4 "Trackball Speed Setting" on page 6-8.

8-4-5-3 Trackball Board Removal Procedure

1.) Remove the Keyboard Assembly, as described in the “Keyboard Assembly Removal Procedure” on page 8-37.
2.) Place the Keyboard Assembly on a flat, clean, stable surface. Working from the top, remove the trackball ring by turning it *counter-clockwise* (1/4 turn).
3.) Carefully turn the Keyboard Assembly over (upside-down) and remove the trackball (it will easily fall out of the cavity).
4.) Remove the Keyboard Bottom Cover, as described in the “Keyboard Bottom Cover Removal Procedure” on page 8-57.
5.) Remove each of the four nuts as indicated in Figure 8-84

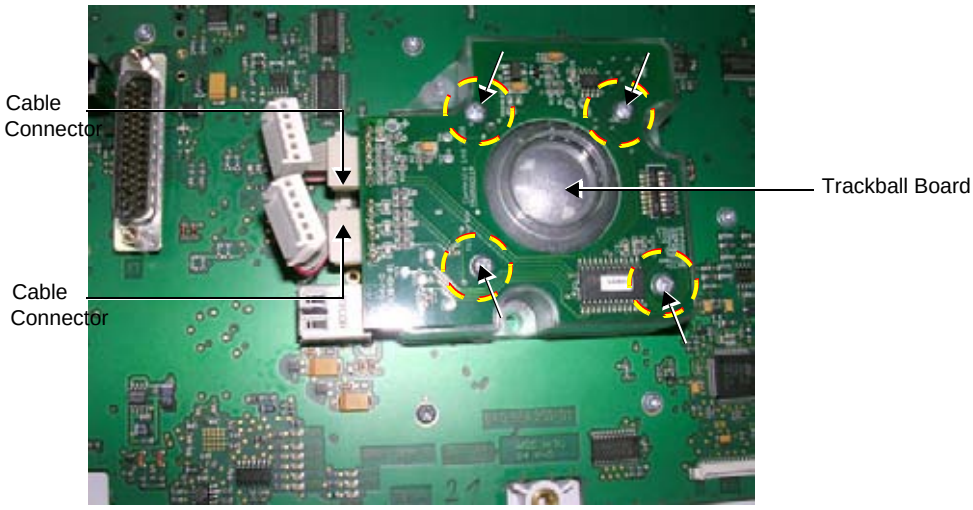


Figure 8-84 Trackball Board Removal

6.) Disconnect the two cable connectors as indicated in Figure 8-84.

7.) Lift the Trackball Board upwards and remove it from the assembly.

8-4-5-4 Trackball Board Installation Procedure

1.) Carefully place the new Trackball Board in the keyboard assembly (refer to Figure 8-84). Make sure it is correctly positioned.

2.) Carefully re-connect the two cables (previously disconnected), as indicated in Figure 8-84.

3.) Return and fasten the four nuts (previously removed) to secure the Trackball Board firmly in position, as indicated in Figure 8-84.

4.) Re-fit the Keyboard Bottom Cover, as described in the “Keyboard Bottom Cover Installation Procedure” on page 8-58.

5.) Install the Keyboard Assembly on the system, as described in the “Keyboard Assembly Installation Procedure” on page 8-40.

6.) Turn ON power to the system.

7.) Set the correct trackball speed (as previously noted) - see 6-1-4 "Trackball Speed Setting" on page 6-8.

8.) Proceed to perform the following functionality tests:

- 4-3-1-1 "Alphanumeric Keyboard Test" on page 4-17
- 4-3-1-2 "Extended Keyboard and Trackball Test" on page 4-17
- 4-3-1-4 "Speakers Tests" on page 4-20
- 4-3-1-5 "Light Detector Test for Vivid S6 N only" on page 4-21
- 4-3-4-1 "USB Test" on page 4-35
- 10-6-4 "Grounding Continuity" on page 10-23
- 10-6-5 "Chassis Current Leakage Test" on page 10-24

8-4-6 TGC Board Replacement Procedure

CAUTION

When performing these procedures, take precautions to avoid damage of electrostatic-sensitive components. Always have the ESD wrist strap connected either to the DIB chassis or to the GND plug at the rear of the scanner, and to your hand.

If a battery is present, first remove the battery as it contains stored energy. Refer to "Battery Removal Procedure" on page 8-106.

8-4-6-1 Tools

Use the appropriate flat screwdriver and T10 torx screwdriver (T8 may also be used), as indicated in the TGC Board replacement procedure.

8-4-6-2 Preparation

Shut down the Vivid S5 N or Vivid S6 N ultrasound unit, as described in *Chapter 3* - System Setup.

8-4-6-3 TGC Board Removal Procedure

1.) Remove the Keyboard Assembly, as described in the "Keyboard Assembly Removal Procedure" on page 8-37.

2.) Remove all the TGC Keycaps, as described in "Alphanumeric Keycap Removal Procedure" on page 8-79.

3.) Carefully place the Keyboard Assembly upside-down on a flat, clean, stable surface.

4.) Remove the Keyboard Bottom Cover, as described in the "Keyboard Bottom Cover Removal Procedure" on page 8-57.

5.) Loosen the four star-shape screws that fasten the TGC Board in position, as indicated in Figure 8-85.

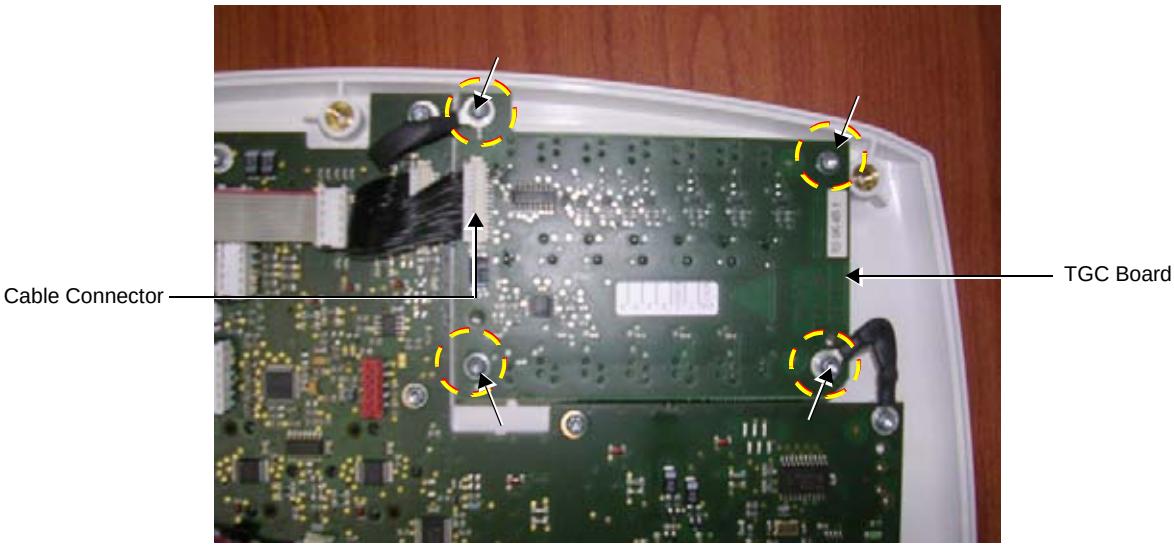


Figure 8-85 Removing the TGC Board

6.) Disconnect the two GND cables.

7.) Disconnect the cable connector, as indicated in Figure 8-85.

8.) Lift the TGC Board upwards and remove it from the assembly.

8-4-6 TGC Board Replacement Procedure (cont'd)

8-4-6-4 TGC Board Installation Procedure

1.) Carefully place the new TGC Board in the keyboard assembly (refer to Figure 8-85). Make sure it is correctly positioned.

2.) Carefully re-connect the cable connector (previously disconnected), as indicated in Figure 8-85.

3.) Fasten the two GND cables (see Figure 8-85).

4.) Fasten the four star-shape screws (previously loosened) to secure the TGC Board firmly in position, as indicated in Figure 8-85.

5.) Re-fit the Keyboard Bottom Cover, as described in the "Keyboard Bottom Cover Installation Procedure" on page 8-58.

6.) Install the Keyboard Assembly on the system, as described in the "Keyboard Assembly Installation Procedure" on page 8-40.

7.) Proceed to perform the following functionality tests:

- 4-3-1-1 "Alphanumeric Keyboard Test" on page 4-17
- 4-3-1-2 "Extended Keyboard and Trackball Test" on page 4-17
- 4-3-1-4 "Speakers Tests" on page 4-20
- 4-3-1-5 "Light Detector Test for Vivid S6 N only" on page 4-21
- 4-3-4-1 "USB Test" on page 4-35
- 10-6-4 "Grounding Continuity" on page 10-23
- 10-6-5 "Chassis Current Leakage Test" on page 10-24

8-4-7 Extended Keyboard Replacement Procedure

CAUTION

When performing these procedures, take precautions to avoid damage of electrostatic-sensitive components. Always have the ESD wrist strap connected either to the DIB chassis or to the GND plug at the rear of the scanner, and to your hand.

If a battery is present, first remove the battery as it contains stored energy. Refer to "Battery Removal Procedure" on page 8-106.

8-4-7-1 Tools

Use the appropriate flat screwdriver and T10 torx screwdriver (T8 may also be used), as indicated in the Extended Keyboard replacement procedure.

8-4-7-2 Preparation

Shut down the Vivid S5 N or Vivid S6 N ultrasound unit, as described in *Chapter 3* - System Setup.

8-4-7-3 Extended Keyboard Removal Procedure

1.) Remove the Keyboard Assembly, as described in the "Keyboard Assembly Removal Procedure" on page 8-37.

2.) Working from the top of the keyboard, use a flat screwdriver to gently lift and remove the four rotary knobs (Figure 8-86).

Figure 8-86 Location of Rotary Knobs

3.) Carefully place the Keyboard Assembly upside-down on a flat, clean, stable surface.

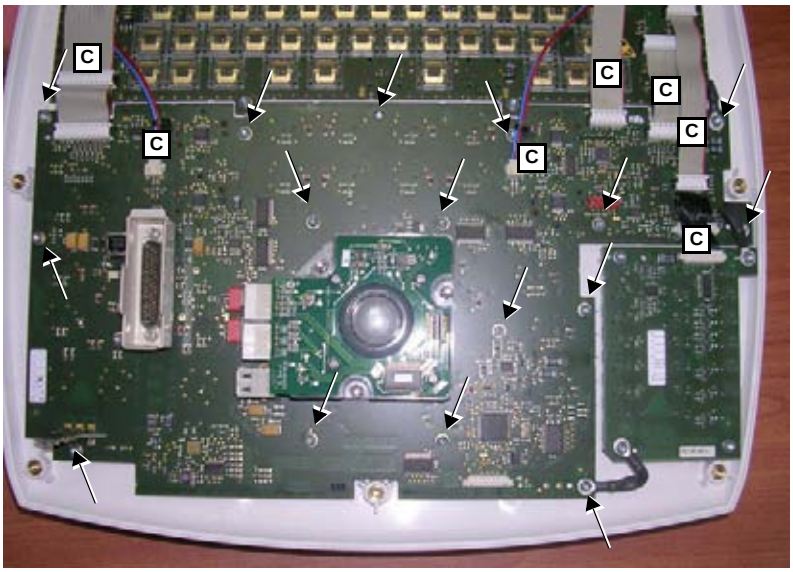
4.) Remove the Keyboard Bottom Cover, as described in the "Keyboard Bottom Cover Removal Procedure" on page 8-57.

5.) Loosen and remove the eleven star-shape screws that fasten the outer areas of Extended Keyboard in position, as indicated in Figure 8-87 on page 8-74.

6.) Loosen and remove the five star-shape screws that fasten the inner areas of Extended Keyboard in position, as indicated in Figure 8-87.

8-4-7 Extended Keyboard Replacement Procedure (cont'd)

7.) Disconnect the seven cable connectors, as indicated in Figure 8-87.



Note: C = cable to be disconnected

Figure 8-87 Extended Keyboard Removal

8.) Lift the Extended Keyboard upwards and remove it from the assembly.

8-4-7-4 Extended Keyboard Installation Procedure

1.) Carefully place the new Keyboard in the keyboard assembly (refer to Figure 8-84). Make sure it is correctly positioned.
2.) Carefully re-connect the seven cable connectors (previously disconnected) - see Figure 8-87.
3.) Return and fasten the five star-shape screws (previously removed) to secure the inner areas of Extended Keyboard in position, as indicated in Figure 8-87.
4.) Return and fasten the eleven star-shape screws (previously removed) to secure the outer areas of Extended Keyboard in position, as indicated in Figure 8-87 on page 8-74.
5.) Re-fit the Keyboard Bottom Cover, as described in the "Keyboard Bottom Cover Installation Procedure" on page 8-58.
6.) Install the Keyboard Assembly on the system, as described in the "Keyboard Assembly Installation Procedure" on page 8-40
7.) Re-fit the four rotary knobs (previously removed - see Figure 8-86).
8.) Proceed to perform the following functionality tests:
- "Alphanumeric Keyboard Test" on page 4-17
- "Extended Keyboard and Trackball Test" on page 4-17
- "Speakers Tests" on page 4-20
- "Light Detector Test for Vivid S6 N only" on page 4-21
- "USB Test" on page 4-35
- "Grounding Continuity" on page 10-23
- "Chassis Current Leakage Test" on page 10-24

8-4-7-5 Releasing an Extended Keyboard Key

NOTE: During the initial keyboard plastic manufacturing process, extra edges or shavings may inadvertently become jammed beneath a key and cause jamming. Follow the instructions below to release the key.

1.) Using a sticky strip (e.g. masking tape or scotch tape), remove the key as follows:

a) Adhere the sticky strip to the key

b) Pull the key up

c) Key removed

Figure 8-88 Removing a Jammed Key from the External Keyboard

2.) Clean and prepare the plastic key socket, as follows:

a.) Cover the key hole with a strip of plastic tape (sellotape) as shown in Figure 8-89.

Figure 8-89 Key Hole Covered with Plastic Tape

b.) Remove any surplus plastic tape gently with sharp tool (e.g. scalpel or similar) - Figure 8-90.

Figure 8-90 Removing Surplus Plastic Tape

Note: Pay attention not to damage the key surface or the painted lettering.

c.) Using air, gently clean inside the key hole to remove any shaved plastic edges.
d.) Remove the plastic tape from the key hole.

3.) Return the key to its correct position on the extended keyboard.

8-4-8 LEDs and Soft Menu Board Replacement Procedure

CAUTION

When performing these procedures, take precautions to avoid damage of electrostatic-sensitive components. Always have the ESD wrist strap connected either to the DIB chassis or to the GND plug at the rear of the scanner, and to your hand.

If a battery is present, first remove the battery as it contains stored energy. Refer to "Battery Removal Procedure" on page 8-106.

8-4-8-1 Tools

Use the appropriate flat screwdriver and T10 torx screwdriver (T8 may also be used), as indicated in the LEDs and Soft Menu Board replacement procedure.

8-4-8-2 Preparation

Shut down the Vivid S5 N or Vivid S6 N ultrasound unit, as described in *Chapter 3* - System Setup.

8-4-8-3 LEDs and Soft Menu Board Removal Procedure

1.) Remove the Keyboard Assembly, as described in the "Keyboard Assembly Removal Procedure" on page 8-37.

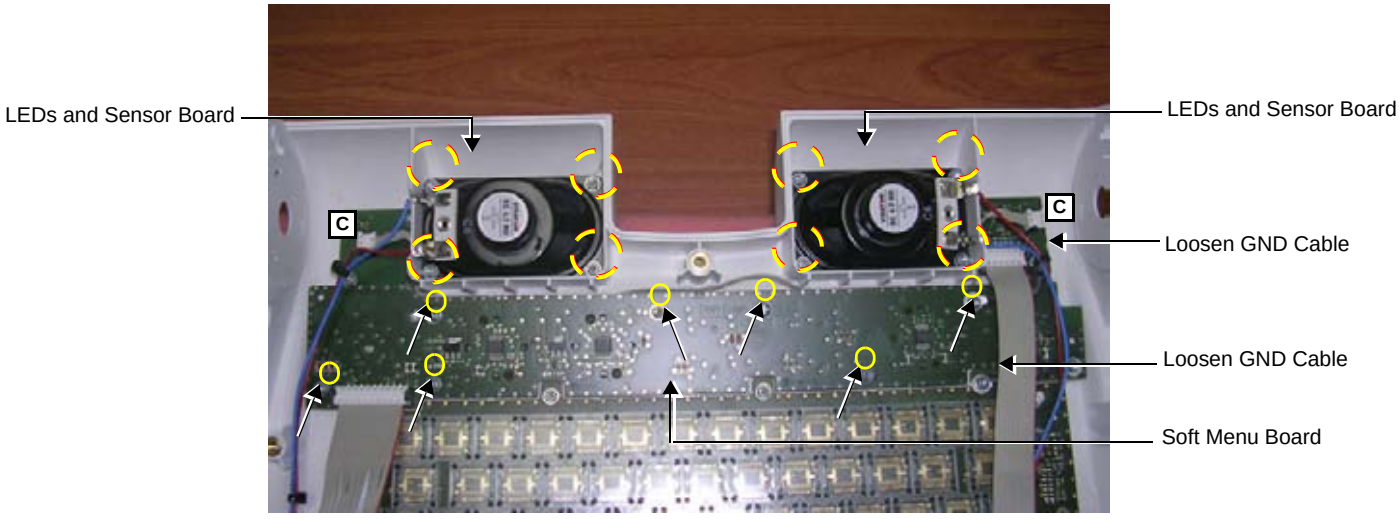
2.) Remove all the TGC Keycaps, as described in "Alphanumeric Keycap Removal Procedure" on page 8-79.

3.) Carefully place the Keyboard Assembly upside-down on a flat, clean, stable surface.

4.) Remove the Keyboard Bottom Cover, as described in the "Keyboard Bottom Cover Removal Procedure" on page 8-57.

5.) Disconnect the two flat cable connectors (one connected to the LED board and one to the Soft Menu), as indicated (labelled **C**) in Figure 8-91. (Leave the flat cable in position).

6.) Loosen and remove the four star-shape screws that fasten each of the LEDs and Sensor boards in position, as shown in Figure 8-91.



Note: C = cable to be disconnected

Figure 8-91 LEDs and Soft Menu Board Removal

8-4-8 LEDs and Soft Menu Board Replacement Procedure (cont'd)

7.) Loosen and remove the seven star-shape screws that fasten the Soft Menu board in position, as shown in Figure 8-91.

8.) Loosen the two GND cables, as indicated in Figure 8-91.

9.) Lift the Soft Menu board out of the keyboard assembly.

8-4-8-4 LEDs and Soft Menu Board Installation Procedure

1.) Carefully place the new Soft Menu board in the keyboard assembly (refer to Figure 8-91 on page 8-77). Make sure the board is correctly positioned.

2.) Carefully re-connect the two GND cables (previously loosened), as indicated in Figure 8-91.

3.) Return and fasten the seven star-shape screws (previously removed) to secure the Soft Menu board in position - refer to Figure 8-91.

4.) Return and fasten the four star-shape screws to secure each of the LEDs and Sensor boards in position - refer to Figure 8-91.

5.) Re-connect the two flat cable connectors (one to the LED board and one to the Soft Menu), as indicated in Figure 8-91.

6.) Re-fit the Keyboard Bottom Cover, as described in the "Keyboard Bottom Cover Installation Procedure" on page 8-58.

7.) Install the Keyboard Assembly on the system, as described in the "Keyboard Assembly Installation Procedure" on page 8-40

8.) Re-fit all the TGC Keycaps (previously removed).

9.) Proceed to perform the following functionality tests:

- 4-3-1-1 "Alphanumeric Keyboard Test" on page 4-17
- 4-3-1-2 "Extended Keyboard and Trackball Test" on page 4-17
- 4-3-1-4 "Speakers Tests" on page 4-20
- 4-3-1-5 "Light Detector Test for Vivid S6 N only" on page 4-21
- 4-3-4-1 "USB Test" on page 4-35
- 10-6-4 "Grounding Continuity" on page 10-23
- 10-6-5 "Chassis Current Leakage Test" on page 10-24

8-4-9 Alphanumeric Keycap Replacement Procedure

8-4-9-1 Tools

Use the appropriate flat screwdriver, as indicated in the keycap replacement procedure.

8-4-9-2 Preparation

None

8-4-9-3 Alphanumeric Keycap Removal Procedure

1) Carefully place a small flat screwdriver between the keycap you wish to remove and its neighboring keycap.
2) Use the screwdriver to gently lever off the defective keycap, until it is completely loosened from its base (see Figure 8-92 below).
3.) Lift off and remove the defective keycap.

Figure 8-92 Keycap Replacement

8-4-9-4 Alphanumeric Keycap Installation Procedure

1) Carefully place the appropriate new keycap in position on the keyboard, taking care to place the plastic alignment pin in the correct position so that the keycap is the right way up and reads correctly.
2) Gently push the keycap down until it snaps into position.
3.) Proceed to perform the following functionality tests:
   - “Alphanumeric Keyboard Test” on page 4-17
   - “USB Test” on page 4-35

8-4-10 Rotary Knob Replacement Procedure

8-4-10-1 Tools

Use the appropriate flat screwdriver, as indicated in the rotary knob replacement procedure.

8-4-10-2 Preparation

None

8-4-10-3 ATGC Rotary Knob Removal Procedure

1) Carefully place a small flat screwdriver between the ATGC Rotary knob and the surface of the keyboard.
2) Use the screwdriver to gently lever off the defective rotary knob, until it is completely loosened from its base.
3.) Lift off and remove the defective knob - see Figure 8-93 below.

Figure 8-93 ATGC Rotary Knob Replacement

8-4-10-4 ATGC Rotary Knob Installation Procedure

1) Carefully place a new ATGC Rotary Knob in position on the keyboard, taking care to place the plastic alignment pin in the correct location.
2) Gently push the ATGC Rotary Knob down until it snaps into position.
3.) Proceed to perform the following functionality tests:
   - "Extended Keyboard and Trackball Test" on page 4-17
   - "USB Test" on page 4-35

8-4-11 ATGC Keycap Replacement Procedure

8-4-11-1 Tools

Use the appropriate flat screwdriver, as indicated in the ATGC Keycap replacement procedure.

8-4-11-2 Preparation

None

8-4-11-3 ATGC Keycap Removal Procedure

1) Carefully place a small flat screwdriver between the ATGC Keycap you wish to remove and the surface of the keyboard.
2) Use the screwdriver to gently lever off the defective keycap, until it is completely loosened from its base.
3.) Lift off and remove the defective keycap - see Figure 8-94 below.

Figure 8-94 ATGC Keycap Replacement

8-4-11-4 ATGC Keycap Installation Procedure

1) Carefully place a new keycap in position on the slider base, taking care to place the plastic alignment pin in the correct location.
2) Gently push the keycap down until it snaps into position.
3.) Proceed to perform the following functionality tests:
   - "Extended Keyboard and Trackball Test" on page 4-17
   - "USB Test" on page 4-35

8-4-12 Speaker Replacement Procedure

CAUTION

When performing these procedures, take precautions to avoid damage of electrostatic-sensitive components. Always have the ESD wrist strap connected either to the DIB chassis or to the GND plug at the rear of the scanner, and to your hand.

If a battery is present, first remove the battery as it contains stored energy. Refer to "Battery Removal Procedure" on page 8-106.

8-4-12-1 Tools

Use the appropriate flat screwdriver and T10 torx screwdriver (T8 may also be used), as indicated in the Speaker replacement procedure.

8-4-12-2 Preparation

Shut down the Vivid S5 N or Vivid S6 N ultrasound unit, as described in *Chapter 3* - System Setup.

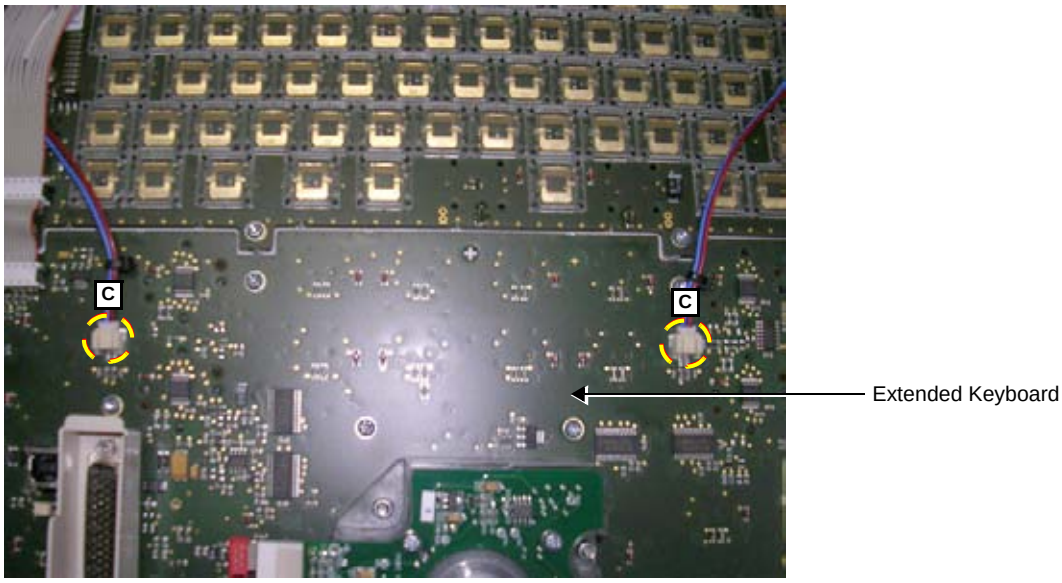
8-4-12-3 Speaker Removal Procedure

1.) Remove the Keyboard Assembly, as described in the "Keyboard Assembly Removal Procedure" on page 8-37.

2.) Carefully place the Keyboard Assembly upside-down on a flat, clean, stable surface.

3.) Remove the Keyboard Bottom Cover, as described in the "Keyboard Bottom Cover Removal Procedure" on page 8-57.

4.) Disconnect the two cables from the Extended Keyboard, as indicated in Figure 8-95.



Note: C = cable to be disconnected

Figure 8-95 Cables Connected to the Extended Keyboard

8-4-12 Speaker Replacement Procedure (cont'd)

5.) Loosen and remove the four star-shape screws that fasten each of the Speakers in position, as shown in Figure 8-91.

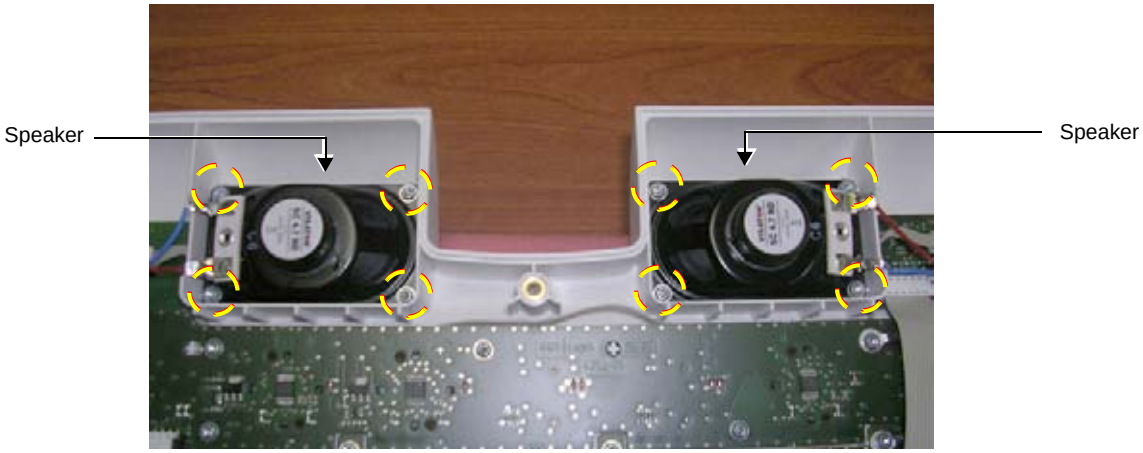


Figure 8-96 Speaker Removal

6.) Remove the speaker from the Keyboard assembly.

8-4-12-4 Speaker Installation Procedure

1.) Carefully place the new Speakers in the keyboard assembly (refer to Figure 8-96). Make sure each speaker is correctly positioned (seated properly).
2.) Return and fasten the four star-shape screws (previously removed) to secure each speaker in position - refer to Figure 8-96. ***Do not overtighten the screws!***
3.) Re-connect the two cables to the Extended Keyboard, as indicated in Figure 8-95 on page 8-82.
4.) Re-fit the Keyboard Bottom Cover, as described in the "Keyboard Bottom Cover Installation Procedure" on page 8-58.
5.) Install the Keyboard Assembly on the system, as described in the "Keyboard Assembly Installation Procedure" on page 8-40.
6.) Proceed to perform the following functionality tests:
   - 4-3-1-1 "Alphanumeric Keyboard Test" on page 4-17
   - 4-3-1-2 "Extended Keyboard and Trackball Test" on page 4-17
   - 4-3-1-4 "Speakers Tests" on page 4-20
   - 4-3-1-5 "Light Detector Test for Vivid S6 N only" on page 4-21
   - 4-3-4-1 "USB Test" on page 4-35
   - 10-6-4 "Grounding Continuity" on page 10-23
   - 10-6-5 "Chassis Current Leakage Test" on page 10-24

Section 8-5
Cable Replacement Procedures

8-5-1 Keyboard and Monitor Cable Replacement Procedure

The Vivid S5 N and Vivid S6 N system's communication and power cables extend from the LCD monitor downwards along the Monitor Arm Assembly, to the Keyboard Interface Assembly, and finally to the Distribution Interface Board (DIB). The replacement procedures are carried out in stages, as described in the sub-sections below.

The following stages show the order in which cables are removed/replaced:

- LCD monitor
- Keyboard assembly
- Upper/Lower Arm Assembly
- Keyboard Interface Assembly
- DIB

8-5-1-1 Tools

Use the appropriate flat and Phillips screwdrivers, Allen Key, appropriate flat spanner, and diagonal side cutter as indicated in the Keyboard or Monitor Cable replacement procedure.

8-5-1-2 Preparation

Shut down the Vivid S5 N or Vivid S6 N ultrasound unit, as described in *Chapter 3 - - System Setup*.

8-5-1-3 Keyboard and Monitor Cable Removal Procedure

1.) Remove the Monitor, as described in "Monitor Removal Procedure" on page 8-24.
2.) Remove the three Allen screws from the LDC metal mounting plate, as show in Figure 8-97.

8-5-1-3-1 Removing Cables from the Monitor Arm Assembly

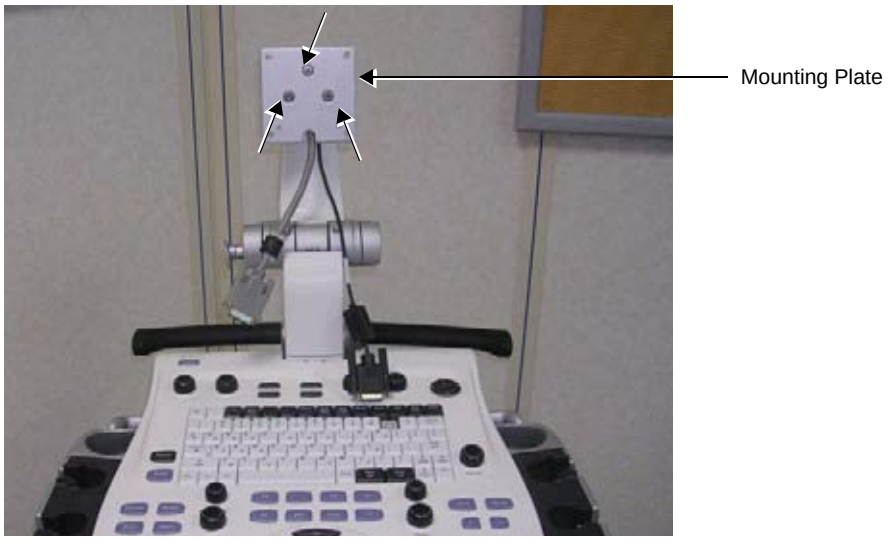


Figure 8-97 Screws Securing Mounting Plate on the Support Column

1.) Remove the LCD arm upper cover from the Monitor Arm Assembly (as shown in Figure 8-98) to expose the LCD cable.

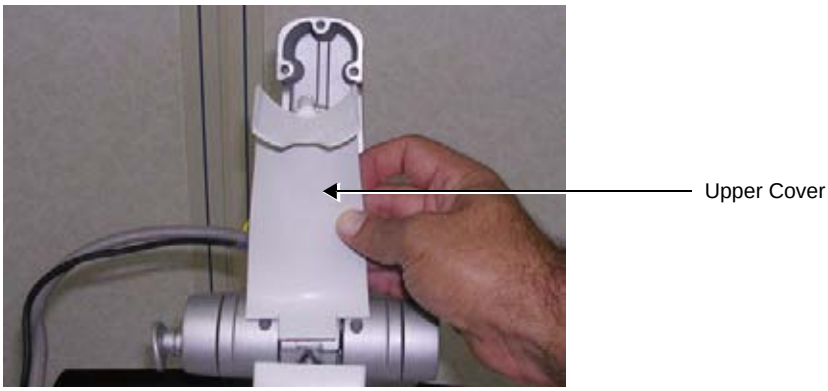


Figure 8-98 Removing the LCD Arm Upper Cover

2.) Remove the lower cover from the Monitor Arm Assembly, as shown in Figure 8-99.

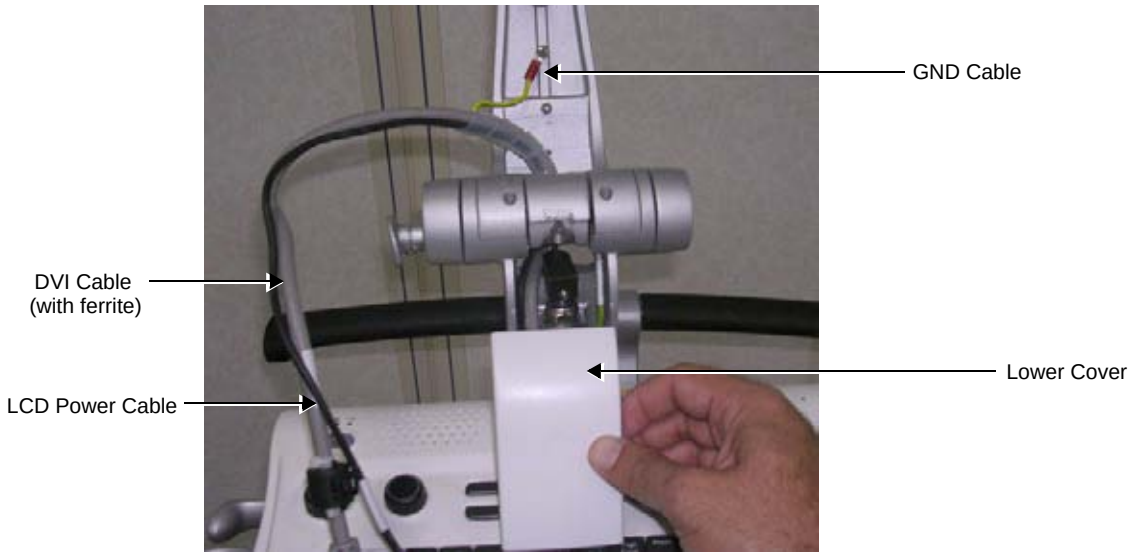


Figure 8-99 Removing the LCD Arm Lower Cover

3.) Disconnect the GND cable (secured to the centre of the upper arm - see Figure 8-99).

4.) Slide the DVI cable (the thicker, grey cable) - together with the attached ferrite - through the opening between the axis of the LCD arm and slide it down, as indicated in Figure 8-100.

5.) Slide the Power cable (the thinner, black cable) through the opening and slide it down (Figure 8-100).

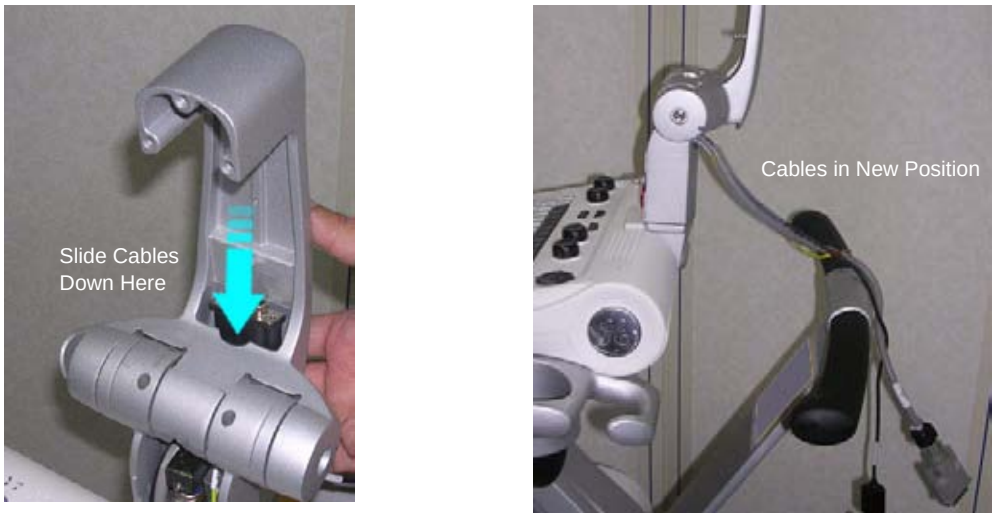


Figure 8-100 Sliding the Cables through the Opening

8-5-1-3-2 Removing Cables from the Keyboard Interface Assembly

1.) Remove the Keyboard from the system, as described in "Keyboard Assembly Removal Procedure" on page 8-37.

2.) Remove the two Phillips screws securing the white bracket, as shown in Figure 8-101.

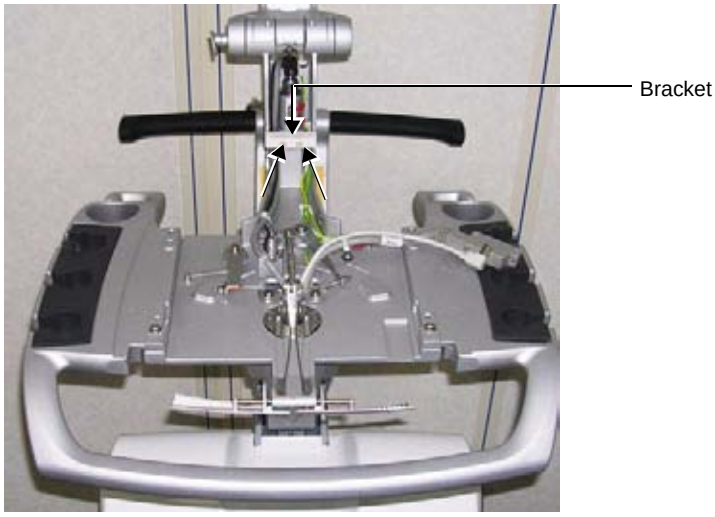


Figure 8-101 Location of Screws and Bracket

Note: A detailed description of the procedure for removing the Alignment Block is described in the "Monitor Arm Replacement Procedure" on page 8-28.

3.) Using an Allen key, remove the Alignment Block as shown in Figure 8-102.
If necessary, use a flat screwdriver for leverage when loosening the block, taking care not to damage the cables.

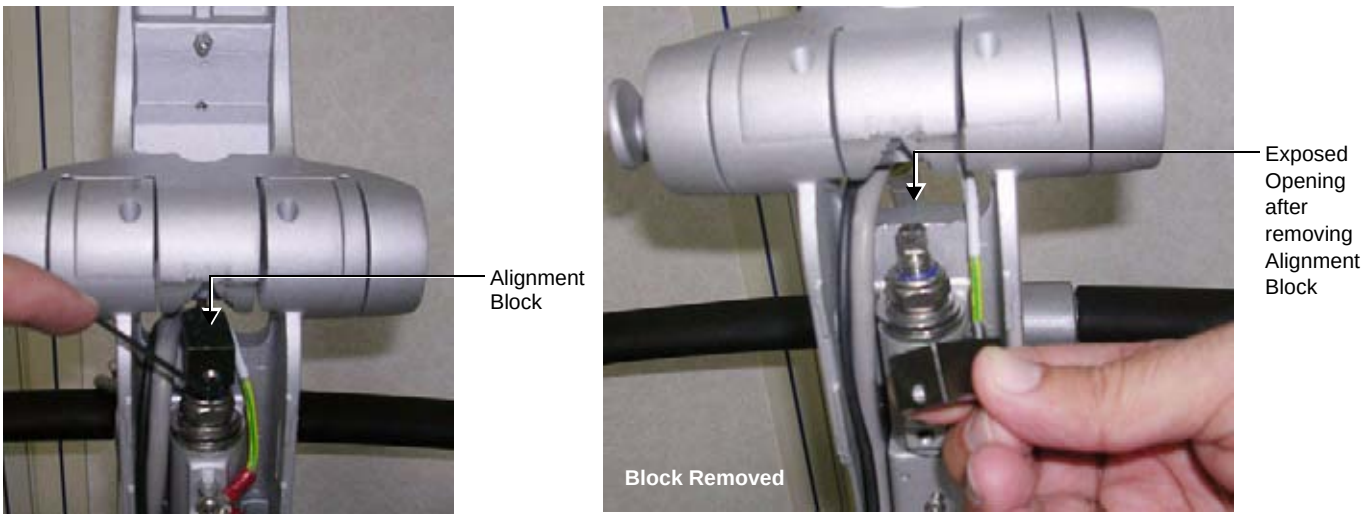


Figure 8-102 Removing the Alignment Block

4.) Slide the DVI cable (the thicker, grey cable) - together with the attached ferrite - through the opening exposed by removal of the alignment block (Figure 8-102) and slide it down.

5.) Slide the Power cable (the thinner, black cable) through the opening and slide it down.

6.) Unwind and remove the plastic spiral cable protector from the cables (shown in Figure 8-103).

Figure 8-103 Removing the Plastic Spiral Cable Protector

7.) Cut the two tie wraps, as indicated in Figure 8-104.

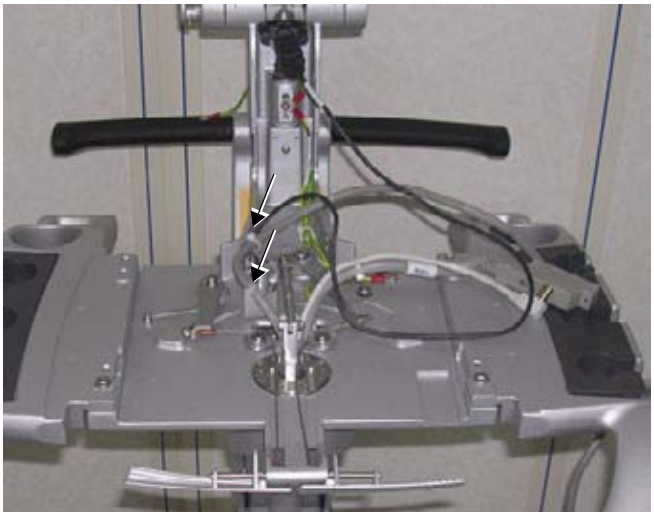
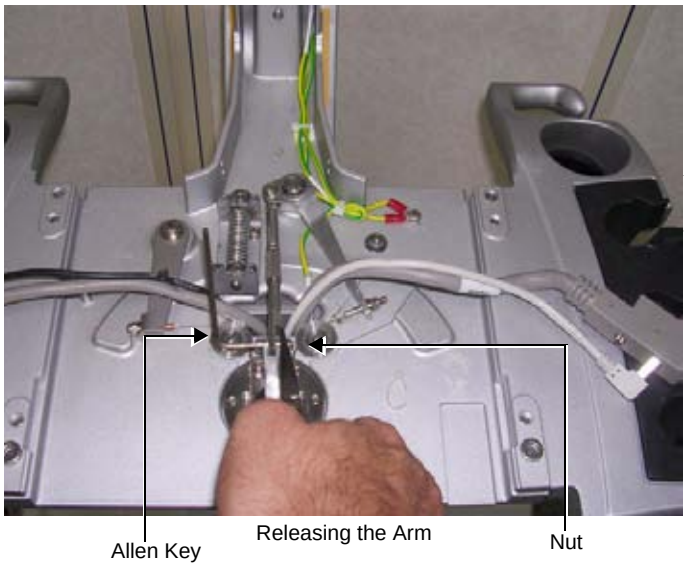


Figure 8-104 Location of Tie Wraps

8.) Using an Allen key, release the screw and nut that secure the arm for the *up/down* mechanism and move the arm to one side, as shown in Figure 8-105.



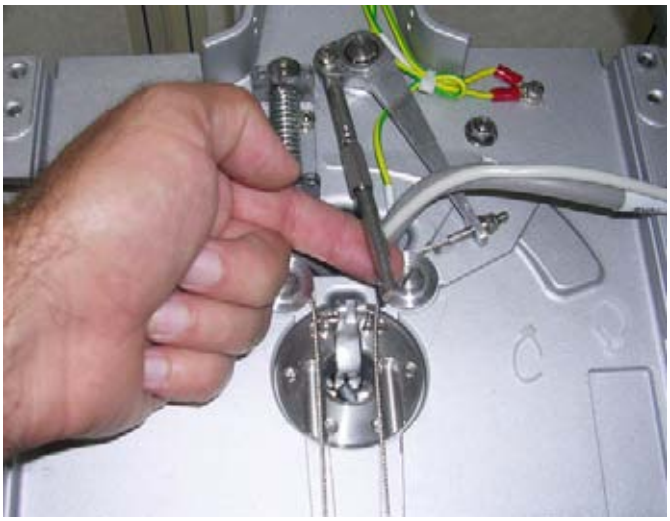


Figure 8-105 Moving the Up/Down Mechanism Arm

9.) Remove the Lower Arm, as described in the "Lower Arm Removal Procedure" on page 8-163.

8-5-1-3-3 Removing Cables from the Upper Arm Assembly

Note: After removing cables from the Keyboard Interface Assembly, it is recommended to lean the keyboard interface platform backwards and to place protective material between the lower arm and the handle, as indicated in Figure 8-106. It is also advisable to temporarily tie the lower arm and handle together in this position, using string or a long tie wrap, as appropriate.

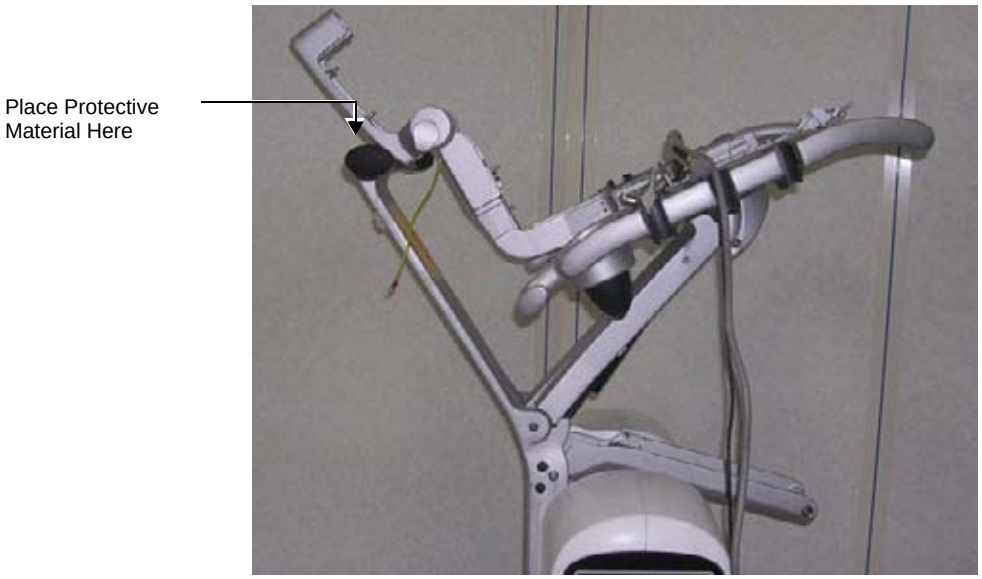


Figure 8-106 Positioning the Keyboard Interface Platform

1.) From below the Keyboard Interface Assembly, remove the two upper cable securing brackets, as indicated in Figure 8-107.
(Use a Phillips screwdriver to carefully loosen the screw and remove it, together with the bracket).

Figure 8-107 Upper Cable Securing Brackets

2.) Loosen (but do not remove) the two lower cable securing brackets, as indicated in Figure 8-108.

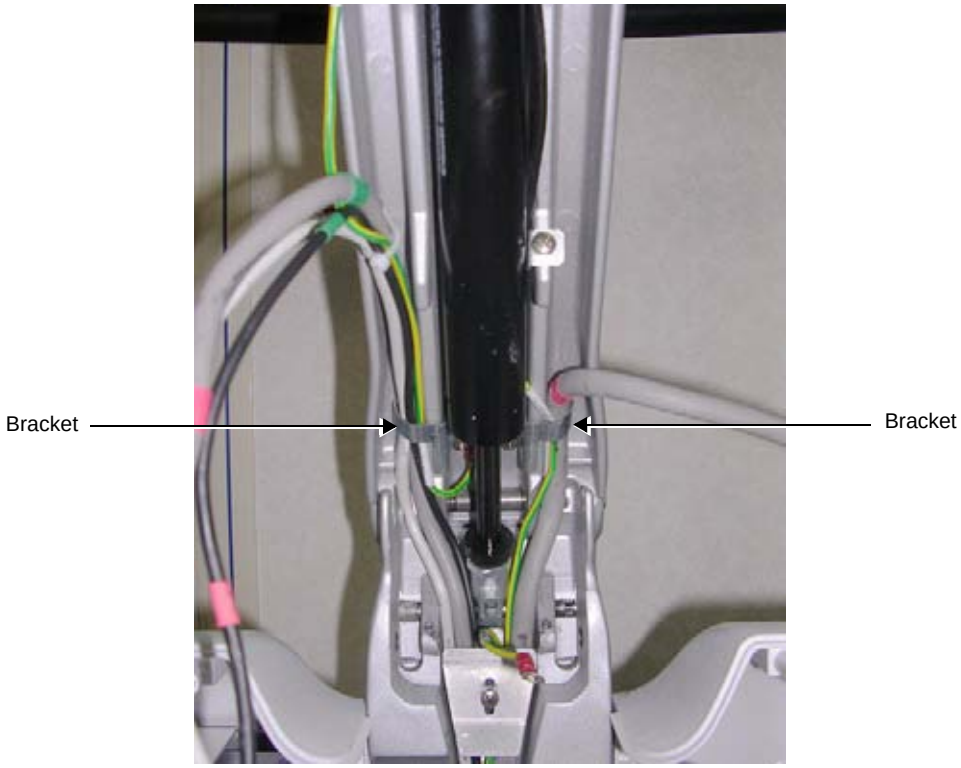


Figure 8-108 Lower Cable Securing Brackets

3.) Proceed to remove the four cables from the Keyboard Interface Assembly by passing them through the aperture in the centre of the platform in the following order:

a.) Push the USB cable down through the aperture, as shown in Figure 8-106.

Figure 8-109 USB Cable

b.) Push the 90° Data cable down through the aperture, as shown in Figure 8-110.

Figure 8-110 Data Cable

c.) Push the DVI cable down through the aperture, as shown in Figure 8-111.

Figure 8-111 DVI Cable

d.) Push the LCD power cable down through the aperture, as shown in Figure 8-112.

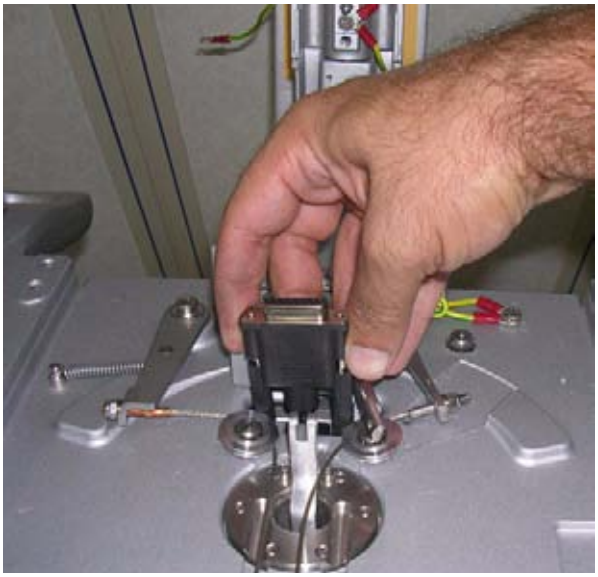


Figure 8-112 LCD Power Cable

8-5-1-3-4 Removing Cables from the Distributions Interface Board (DIB)

1.) Remove the system covers, as described in the following procedures (see also):

- "Left Side Cover Removal Procedure" on page 8-6
- "Right Side Cover Removal Procedure" on page 8-5
- "Front Cover Removal Procedure" on page 8-16

Figure 8-113 System with Covers Removed

2.) Remove the central metal bracket, as indicated in Figure 8-114.

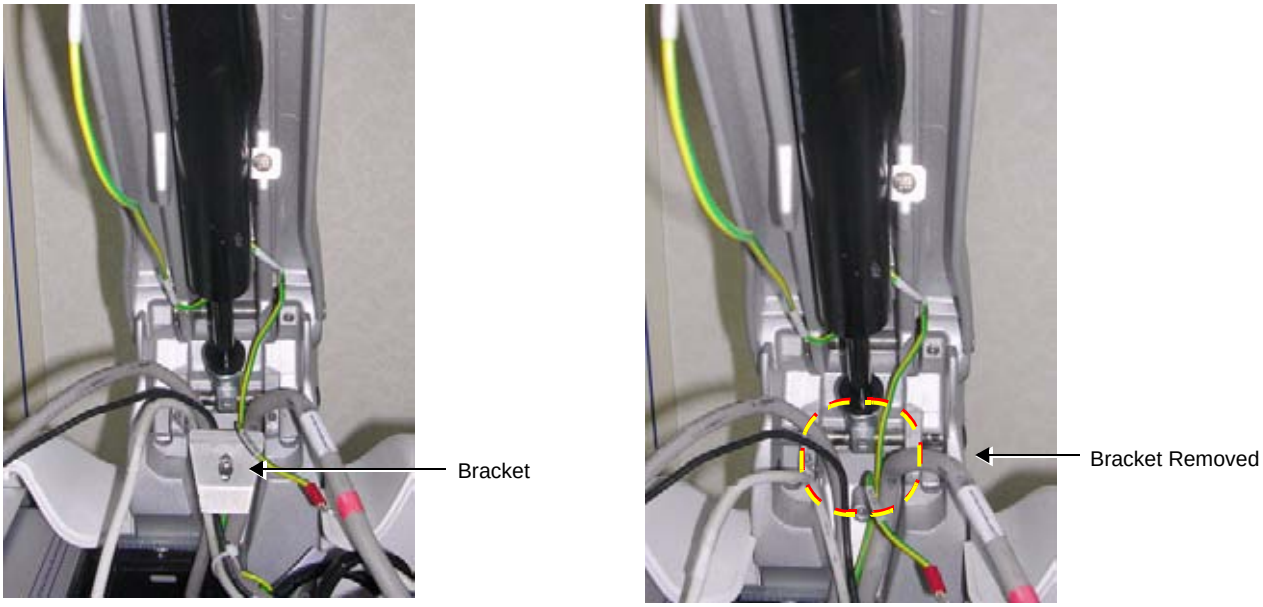


Figure 8-114 Bracket Removal

3.) To complete the procedure, disconnect the relevant cables from the Distribution Interface Board (DIB); see Figure 8-115.

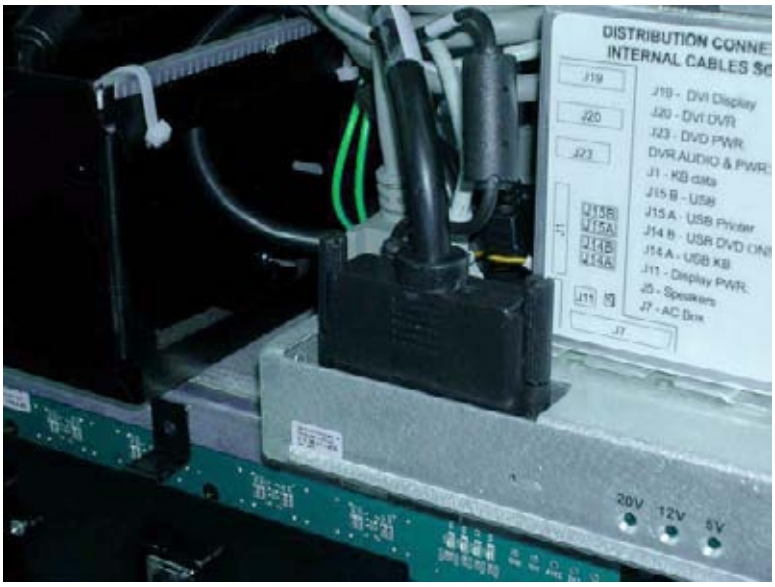


Figure 8-115 Cables Connected to Distribution Interface Board

8-5-1-4 Keyboard and Monitor Cable Installation Procedure

1.) Re-connect all the relevant cables (including the new Keyboard power cable and Monitor cable) to the Distribution Interface Board (DIB); see Figure 8-115.

2.) Re-fit the central metal bracket, as indicated in Figure 8-114.

3.) Return the system covers, as described in the following procedures (see also):

- "Front Cover Installation Procedure" on page 8-18
- "Right Side Cover Installation Procedure" on page 8-5
- "Left Side Cover Installation Procedure" on page 8-7

4.) Proceed to route the following four cables up through the aperture in the base of the Keyboard Interface Assembly, working in the following order:

a.) LCD power cable - refer to Figure 8-112.
b.) DVI cable - refer to Figure 8-111.
c.) 90° Data - refer to Figure 8-110.
d.) USB cable - refer to Figure 8-109.

5.) Fasten the two lower cable securing brackets, as indicated in Figure 8-108.

6.) Return and fasten the two upper cable securing brackets (previously removed), as indicated in Figure 8-107. (Use a Phillips screwdriver to carefully tighten the screws)

Note: Before the next procedure, it is recommended to lean the keyboard interface platform backwards and to place protective material between the lower arm and the handle, as indicated in Figure 8-106.

8-5-1-4-1 Installing the Cables in the Monitor Arm Assembly

The cables are threaded from the Keyboard Interface Assembly to the Monitor Arm Assembly and upwards to the LCD monitor; in the process, the previously-dismantled parts are re-installed. Proceed as follows:

1.) Re-fit the lower arm, as described in the "Lower Arm Installation Procedure" on page 8-167.

2.) Return the *up/down* lever to its central position and secure it using the screw and nut (previously removed).
Use an Allen key to secure the lever firmly in position - refer to Figure 8-105 on page 8-88.

3.) Secure the cables with two tie wraps, as indicated in Figure 8-104 on page 8-88.

4.) Thread the thinner, black power cable through the aperture in the Monitor Arm assembly and push it upwards - Figure 8-116.

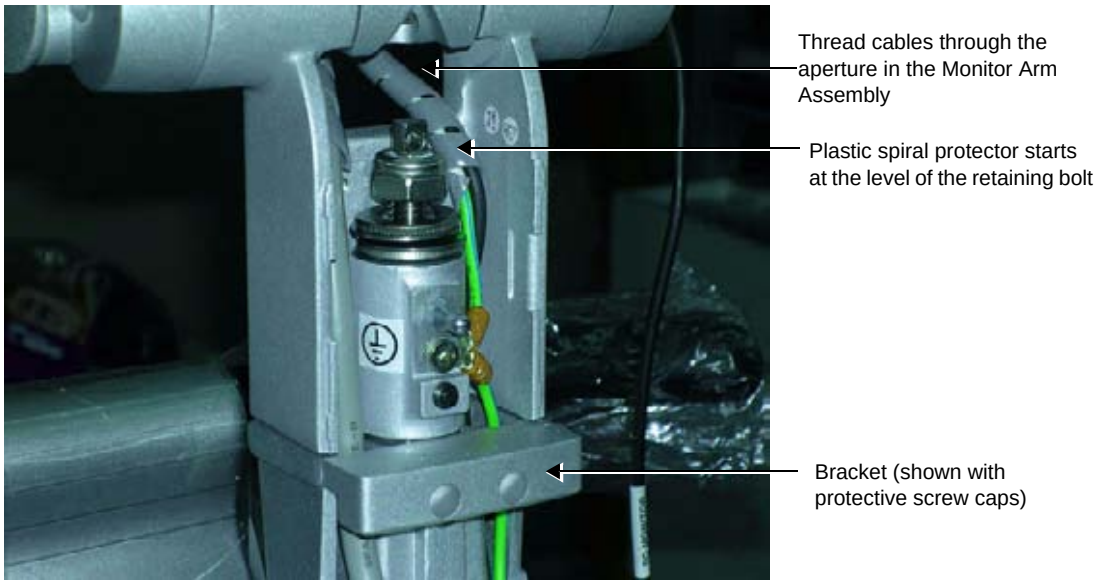

Thread cables through the aperture in the Monitor Arm Assembly
Plastic spiral protector starts at the level of the retaining bolt
Bracket (shown with protective screw caps)

Figure 8-116 Cable Aperture in the Monitor Arm Assembly

5.) Thread the thicker, grey DVI cable - together with the attached ferrite - through the opening in the Monitor Arm assembly and push it upwards - Figure 8-116.

6.) Return and wind the plastic spiral cable protector around the cables, as shown in Figure 8-103. Start the spiral of the plastic cable protector at the level of the Monitor Arm retaining bolt.

7.) Return the alignment block (previously removed) and using an Allen key, fasten it securely as shown in Figure 8-102. (Take care not to damage the cables).

Note: A detailed description of the procedure for returning the Alignment Block is described in the "Monitor Arm Installation Procedure" on page 8-31.

8.) Place the Power cable (the thinner, black cable) and the DVI cable (the thicker, grey cable) together with the attached ferrite into their positions on the Monitor Arm assembly and secure them with the white bracket, using the two Phillips screws previously removed, as shown in Figure 8-117.

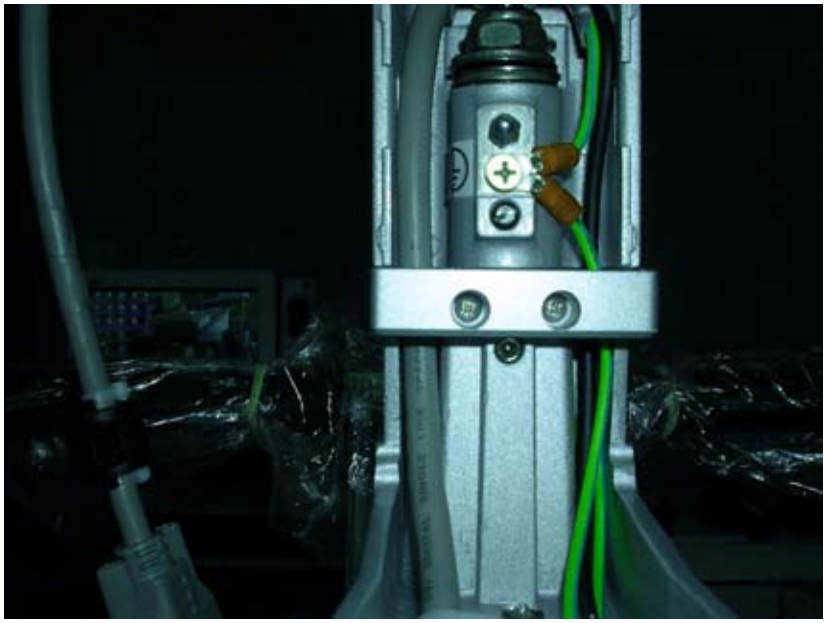


Figure 8-117 Bracket Securing Cables in Monitor Arm

9.) Return the Keyboard Assembly to the system, as described in "Keyboard Assembly Installation Procedure" on page 8-40.

10.) Thread the Power cable (the thinner, black cable) through the opening behind the axis of the LCD arm and slide it upwards, see Figure 8-118.

Figure 8-118 Cables Threaded Past Monitor Arm Axis towards LCD

11.) Thread the DVI cable (the thicker, grey cable) - together with the attached ferrite - through the opening and slide it upwards, as indicated in Figure 8-118.

12.) Re-connect the GND cable to the centre of the upper arm - see Figure 8-99.

13.) While moving the keyboard slightly up and down with one hand, push the securing pin into the base of the operator panel (below the keyboard). If necessary, gently tap it into position using the handle of a screwdriver. Refer to Figure 8-201 on page 8-164.

14.) Return the LCD arm lower cover to the arm (push and snap it into position) - refer to Figure 8-99.

15.) Return the LCD arm upper cover to the arm (push and snap it into position) - refer to Figure 8-98.

16.) Return and fasten the three Allen screws to the LDC metal mounting plate, as show in Figure 8-97.

17.) Return the Monitor, as described in "Monitor Installation Procedure" on page 8-27.

18.) Turn ON power to the system.

19.) Proceed to perform the following functionality tests:

- "Grounding Continuity" on page 10-23
- "Chassis Current Leakage Test" on page 10-24
- "Speakers Tests" on page 4-20
- "Alphanumeric Keyboard Test" on page 4-17
- "Extended Keyboard and Trackball Test" on page 4-17
- "Light Detector Test for Vivid S6 N only" on page 4-21
- "USB Test" on page 4-35
- "Monitor Test" on page 4-21

Section 8-6
Lower Section Components Replacement Procedures

NOTE: When replacing Vivid S5 N or Vivid S6 N lower section components, after removal of the system covers (left and right sides; front), the cabinet cage assembly should be removed from the main assembly (to gain access to the internal components) and placed on a stable surface. These steps are described in the procedure below.

CAUTION

When performing these procedures, take precautions to avoid damage of electrostatic-sensitive components. Always have the ESD wrist strap connected either to the DIB chassis or to the GND plug at the rear of the scanner, and to your hand.

If a battery is present, first remove the battery as it contains stored energy. Refer to "Battery Removal Procedure" on page 8-106.

8-6-1 Opening and Removing the Cabinet Cage Assembly

8-6-1-1 Tools

None

8-6-1-2 Preparation

Shut down the Vivid S5 N or Vivid S6 N ultrasound unit, as described in *Chapter 3* - System Setup.

8-6-1-3 Cabinet Cage Assembly Opening and Removal Procedure

1) Remove the Vivid S5 N or Vivid S6 N left and right side covers, as described in the "Left Side Cover Removal Procedure" on page 8-6 and "Right Side Cover Removal Procedure" on page 8-5.
2) Remove the Vivid S5 N or Vivid S6 N front cover, as described in the "Front Cover Removal Procedure" on page 8-16.
3) Undo the two fastening latches on the left side of the cabinet cage assembly and carefully swing the cage door to the open position (Figure 8-119).

Figure 8-119 Unfastening the Latches and Opening the Cage

4.) Place the end of the securing hook into the hole on the top of the cage door to fasten the door in the open position (see Figure 8-120).

8-6-1 Opening and Removing the Cabinet Cage Assembly (cont'd)

Figure 8-120 Fastening the Cage Door Open

5.) Release the end of the USB cable from the cable clip, as shown below.

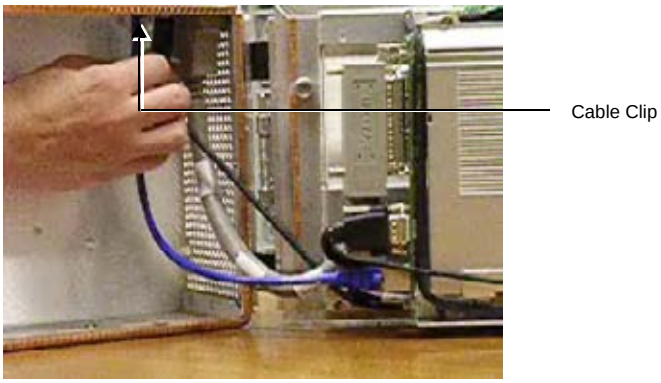


Figure 8-121 Releasing USB Cable from the Cable Clip

6.) Release the LAN connector from the Back End.

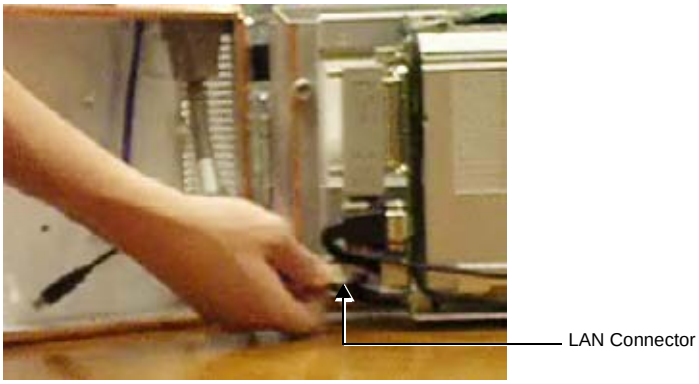


Figure 8-122 Releasing the LAN Connector from the Back End

8-6-1 Opening and Removing the Cabinet Cage Assembly (cont'd)

7.) Unfasten the two knurled (ridged) screws on the Docking Connector and release the Docking Connector from the Back End (Figure 8-123).

Figure 8-123 Releasing the Docking Connector

8.) Cut the cable tie securing the KB Data cable to the battery bracket.

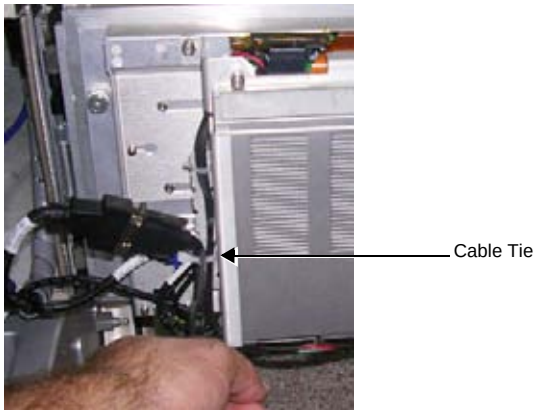


Figure 8-124 Location of Cable Tie

9.) Using a flat screwdriver, release the two connectors that connect the KB Data cable to the KB outlet on the Back End and to the ECG USB connector on the one side; on the other side to the bundle of cables connected to the DIB.

8-6-1 Opening and Removing the Cabinet Cage Assembly (cont'd)

Figure 8-125 Releasing Connectors on the KB Data Cable

10.) Disconnect the VGA cable from the Back End (use a flat screwdriver to release the two screws on the connector).

Figure 8-126 Releasing Connectors on the VGA Cable

11.) Pull down the spring latch to release the cage door from its securing hinge - see Figure 8-127.

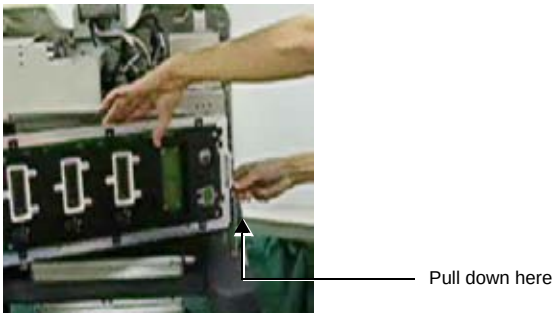


Figure 8-127 Releasing the Cage Door Spring Latch

8-6-1 Opening and Removing the Cabinet Cage Assembly (cont'd)

12.) Carefully lift the cage *upwards* to free it from the securing hinge (see Figure 8-128) and place it on a clean, stable surface.

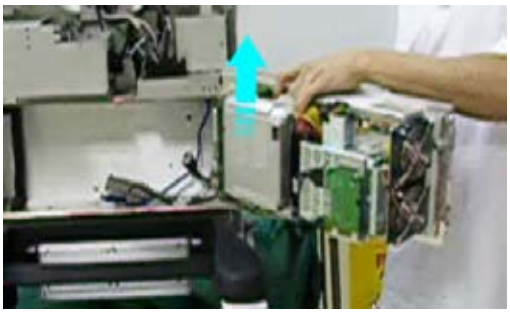


Figure 8-128 Removing the Cage from the Securing Hinge

13.) Unfasten each of the two thumbscrews on either side of the cabinet cage, as shown in Figure 8-129.

.

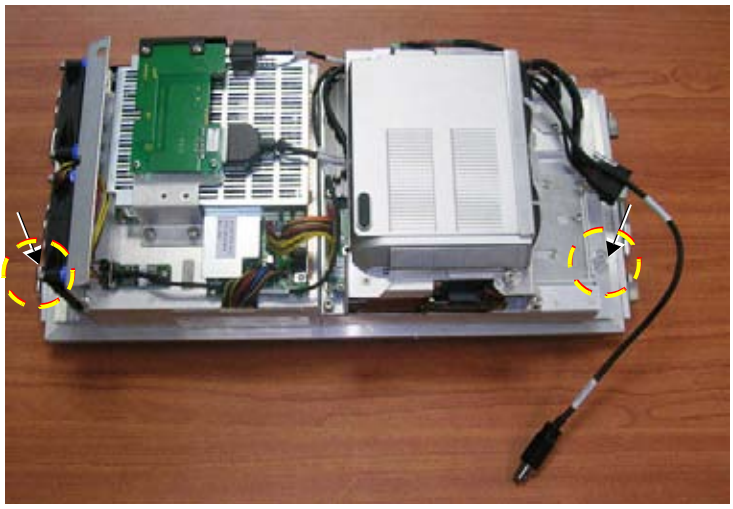


Figure 8-129 Cabinet Cage Thumbscrews

8-6-1 Opening and Removing the Cabinet Cage Assembly (cont'd)

14.) Unfold the cage to the fully-open position, as shown in Figure 8-130.

Figure 8-130 Cabinet Cage - Unfolded

It is now possible to gain easy access to the components inside the cabinet cage.

CAUTION: When performing lower section component replacement procedures, an ESD wriststrap must be worn to prevent the risk of ESD causing damage to a board.

8-6-1-4 Cabinet Cage Assembly Closing and Installation Procedure

1.) Fold the cabinet cage assembly in the closed position and fasten securely by tightening each of the two thumbscrews on either side of the cabinet cage, as shown in Figure 8-129 on page 8-102.

2.) Carefully lift the cage into position on the system taking care to mount it properly on the securing hinge - refer to Figure 8-128 on page 8-102.

3.) Make sure the securing hinge latch is properly closed - refer to Figure 8-127 on page 8-101.

4.) Place the end of the securing hook into the hole on the top of the cage door to fasten the door in the open position (see Figure 8-120 on page 8-99).

5.) Reconnect the VGA Cable to the Back End.

6.) Fasten the two connectors to connect the KB Data cable to the KB outlet on the Back End and to the ECG USB connector on the one side; on the other side to the bundle of cables connected to the DIB.

7.) Secure the KB Data cable to the battery bracket using a cable tie.

8.) Reconnect the Docking Connector to the Back End and fasten securely using the two knurled (ridged) screws on the Docking Connector (refer to Figure 8-123 on page 8-100).

NOTICE When performing the next two steps, make sure the LAN and USB cables are placed ***over*** the thick cable - i.e. *not underneath* (see Figure 8-131), otherwise the cage door will not close properly.

9.) Reconnect the LAN connector to the Back End (refer to Figure 8-122 on page 8-99).

10.) Reconnect the end of the USB cable and secure in position with the cable clip, as shown in Figure 8-131.

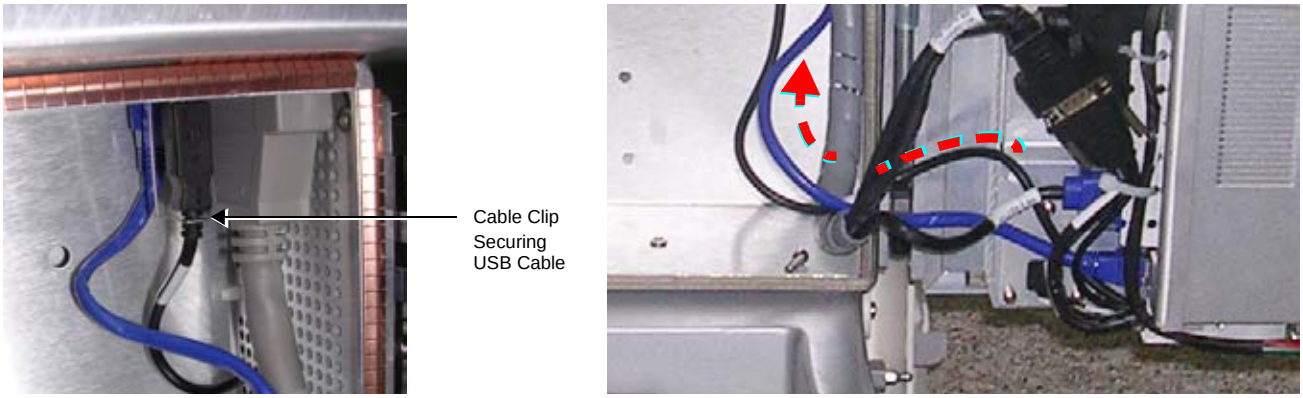


Figure 8-131 Cables Re-connected

11) Release the securing hook from the top of cage door, then carefully swing the door to the closed position - see Figure 8-119 on page 8-98. See also note below and Figure 8-132.

Note: When closing the cage door, take care to ensure that the protective gasket (kapton strip) surrounding the PSB (Probe Selection Board) - shown in Figure 8-132 - is properly seated and does not become pinched or damaged.

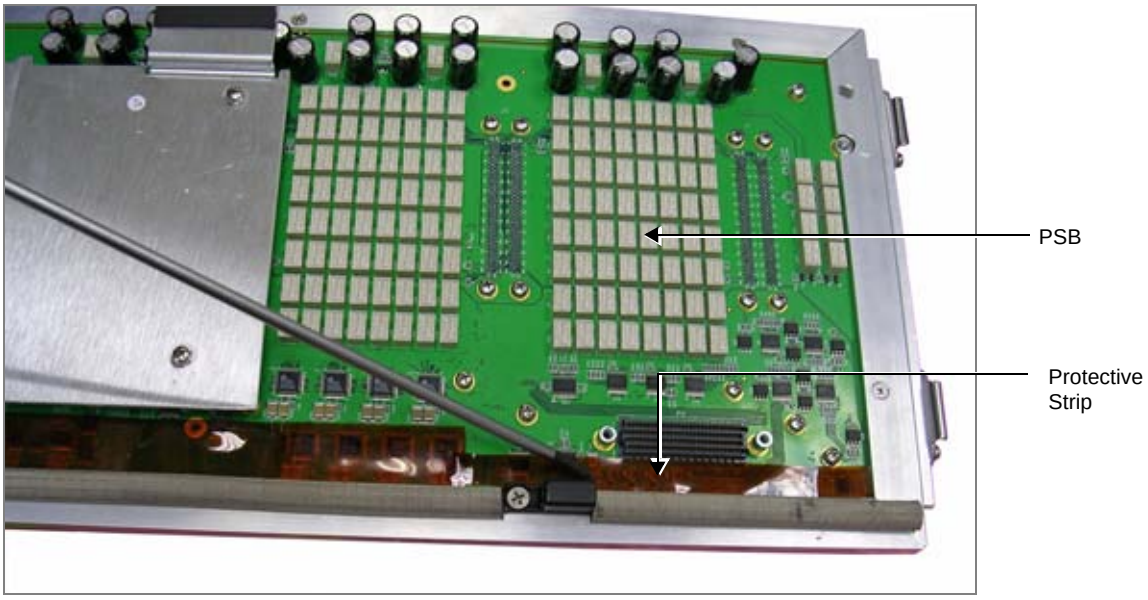


Figure 8-132 PSB and Surrounding Protective Strip

12.) Close the two fastening latches on the left side of the cabinet cage assembly (Figure 8-119).

13) Return the front cover, as described in the 8-2-6-4 "Front Cover Installation Procedure" on page 8-18.

14) Return the left and right side covers, as described in the 8-2-3-4 "Left Side Cover Installation Procedure" on page 8-7 and 8-2-2-4 "Right Side Cover Installation Procedure" on page 8-5.

15.) Turn ON power to the system.

16.) Proceed to perform the following functionality tests:

- 10-6-4 "Grounding Continuity" on page 10-23
- 10-6-5 "Chassis Current Leakage Test" on page 10-24
- 7-2-4-2-1 "Calibration" on page 7-10
- 7-2-4-1 "Full System Test" on page 7-9

8-6-2 Battery Replacement Procedure

NOTE: This procedure is applicable to Vivid S6 N systems only.

8-6-2-1 Tools

Use the appropriate Phillips-type screwdrivers as indicated in the Battery replacement procedure.

8-6-2-2 Time Required

1 minute

8-6-2-3 Preparations

Shut down the Vivid S6 N ultrasound unit, as described in *Chapter 3* - System Setup.

8-6-2-4 Battery Removal Procedure

1) Remove the Vivid S6 N left and right side covers, as described in the "Left Side Cover Removal Procedure" on page 8-6 and "Right Side Cover Removal Procedure" on page 8-5.
2) Remove the Vivid S6 N front cover, as described in the "Front Cover Removal Procedure" on page 8-16.
3) Open and remove the cabinet cage assembly, as described in "Opening and Removing the Cabinet Cage Assembly" on page 8-98.
4) Using a small Phillips screwdriver, loosen (but do not remove) the screw on the side of the battery compartment (near the bottom of the cage - see Figure 8-133).

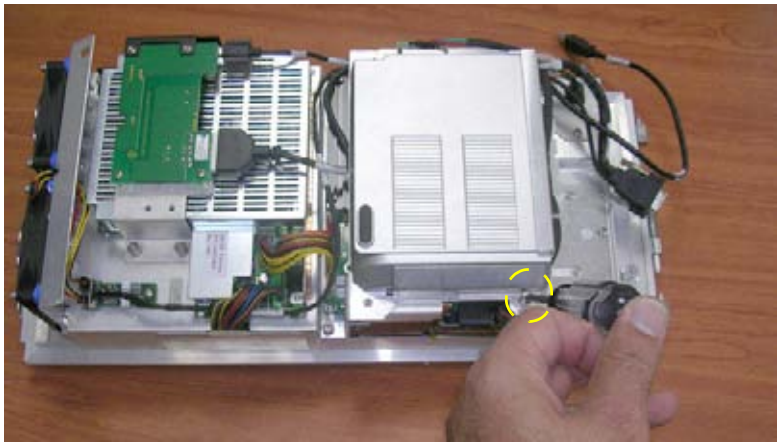


Figure 8-133 Loosening the Screw on the Battery Compartment

8-6-2 Battery Replacement Procedure (cont'd)

5) Remove the metal securing bracket (with the screw attached) by sliding it to the side and lifting it up.

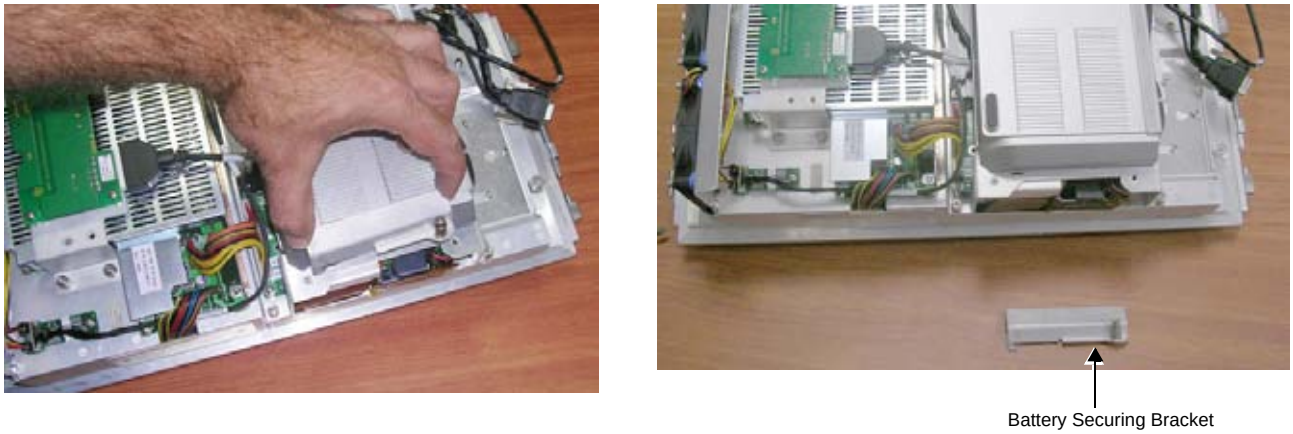


Figure 8-134 Removing the Battery Securing Bracket

6) Slide the Battery *upwards* and out of the battery compartment along the grooves - until it is fully removed from the system (see Figure 8-135).

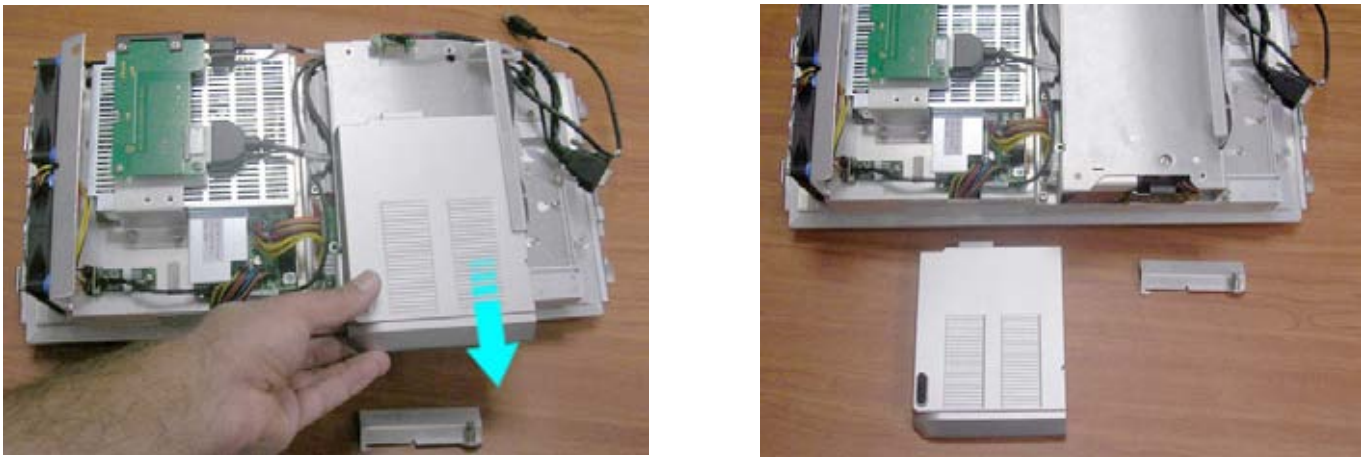


Figure 8-135 Sliding the Vivid S6 N Battery out of the Battery Compartment

NOTE: WHEN REMOVING A DEFECTIVE BATTERY, ENSURE THAT IT IS DISPOSED OF IN ACCORDANCE WITH LOCAL REGULATIONS. ALTERNATIVELY, FORWARD IT TO GE HEALTHCARE FOR PROPER DISPOSAL.

8-6-2 Battery Replacement Procedure (cont'd)

8-6-2-5 Battery Installation Procedure

WARNING: The Vivid S6 N battery has a safety device.
***DO NOT ATTEMPT TO DIS-ASSEMBLE OR ALTER THE BATTERY*!**
Always observe the precautions listed in *1-4-3 "Vivid S6 N Battery Safety" on page 1-14*.

CAUTION: USE ONLY BATTERIES APPROVED BY GE HEALTHCARE **AS SUITABLE FOR USE WITH THE VIVID S6 N ULTRASOUND SCANNER**

1) Holding the cabinet cage assembly steady with one hand, carefully slide the replacement battery sideways into the battery compartment.

2.) Make sure the battery is properly inserted all the way, before proceeding to the next step (refer to Figure 8-134).

3) Return the metal securing bracket (previously removed) fasten in position with the attached screw (refer to Figure 8-133).

4) Return the cabinet cage assembly to the system, reconnect the cables (previously disconnected), close the cabinet cage door and fasten securely with the two latches.
Refer to the 8-6-1-4 "Cabinet Cage Assembly Closing and Installation Procedure" on page 8-104.

5) Return the Vivid S6 N front cover, as described in the 8-2-6-4 "Front Cover Installation Procedure" on page 8-18.

6) Return the Vivid S6 N left and right side covers, as described in the "Left Side Cover Installation Procedure" on page 8-7 and 8-2-2-4 "Right Side Cover Installation Procedure" on page 8-5.

7.) Turn ON power to the Vivid S6 N ultrasound scanner.

8.) Proceed to perform the following functionality tests:

- 10-6-4 "Grounding Continuity" on page 10-23
- 10-6-5 "Chassis Current Leakage Test" on page 10-24
- 7-2-4-2-1 "Calibration" on page 7-10
- 7-2-4-1 "Full System Test" on page 7-9

8-6-3 Battery Bracket Replacement Procedure

NOTE: This procedure is applicable to Vivid S6 N systems only.

8-6-3-1 Tools

Use the appropriate Phillips-type screwdrivers and a side cutter as indicated in the Battery Bracket replacement procedure.

8-6-3-2 Time Required

1 minute

8-6-3-3 Preparations

Shut down the Vivid S6 N ultrasound unit, as described in *Chapter 3* - System Setup.

8-6-3-4 Battery Bracket Removal Procedure

1) Remove the Vivid S6 N left and right side covers, as described in the 8-2-3-3 "Left Side Cover Removal Procedure" on page 8-6 and 8-2-2-3 "Right Side Cover Removal Procedure" on page 8-5.
2) Remove the Vivid S6 N front cover, as described in the 8-2-6-3 "Front Cover Removal Procedure" on page 8-16.
3) Open and remove the cabinet cage assembly and place it on a stable surface, as described in 8-6-1 "Opening and Removing the Cabinet Cage Assembly" on page 8-98.
4.) Remove the battery, as described in the 8-6-2-4 "Battery Removal Procedure" on page 8-106.
5.) Cut the cable tie wraps.
6.) Loosen (do not remove) the four screws that secure the battery bracket to the cage assembly, as indicated in Figure 8-136.

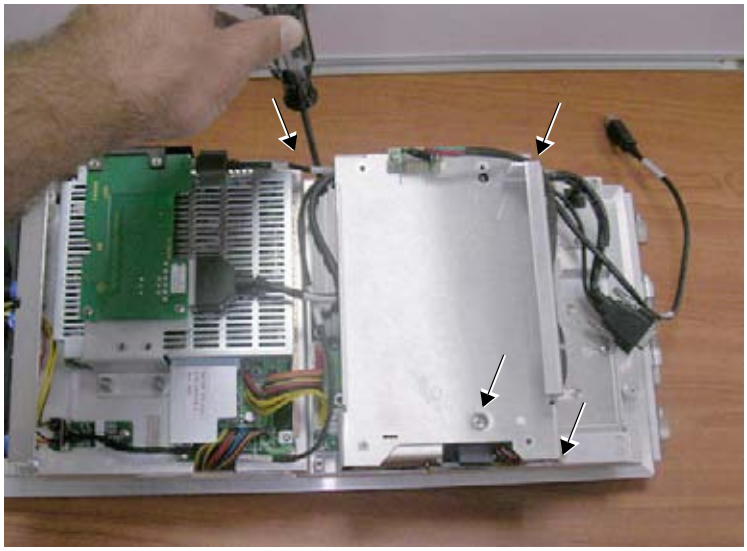


Figure 8-136 Loosening the Battery Bracket Securing Screws

7.) Carefully lift the end of the battery bracket that is facing you *upwards* (while sliding it forwards slightly to free it from the secured position) to partially remove it from the cage (Figure 8-137).

8-6-3 Battery Bracket Replacement Procedure (cont'd)

NOTE: The bracket cannot be removed completely at this stage as it still connected to the system via the battery cable, as explained in the next step.

Figure 8-137 Removing the Battery Bracket

8.) Tilt the battery bracket sideways (swing it around), then disconnect the battery cable connector from the BEP (Figure 8-138).

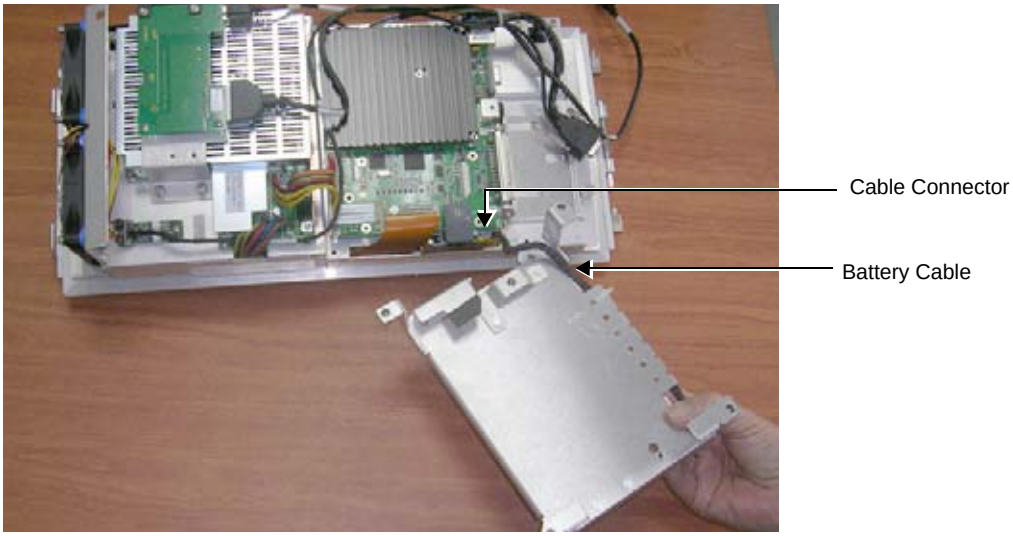


Figure 8-138 Battery Cable Connected to the BEP

9.) Remove the battery bracket and tilt it upside down on the table surface (Figure 8-139).

8-6-3 Battery Bracket Replacement Procedure (cont'd)

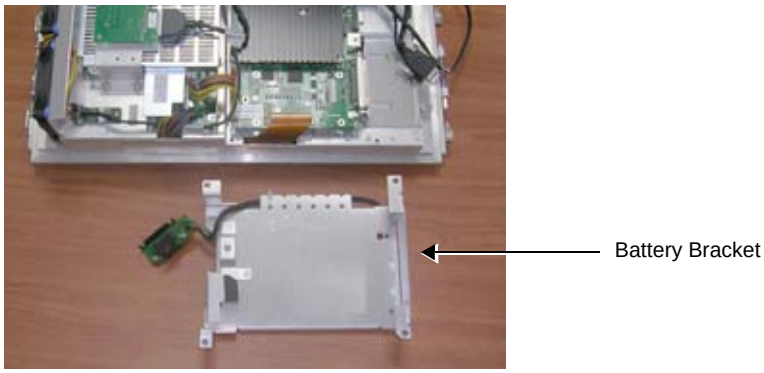


Figure 8-139 Battery Bracket Removed from the System

8-6-3-5 Battery Bracket Installation Procedure

1.) Working with the battery bracket upside down on the table surface (and close to the system), reconnect the battery cable (attached to the battery bracket) to the BEP (see Figure 8-138 on page 8-110).

2.) Carefully lift the battery bracket back and turning it over, swing into position on the cage assembly (see Figure 8-137 on page 8-110).

3.) Slide the bracket in place and make sure it is seated correctly.

4.) Return and fasten the four screws (previously removed) to secure the battery bracket to the cage assembly, as indicated in Figure 8-136 on page 8-109.

5.) Return the battery, as described in the 8-6-2-5 "Battery Installation Procedure" on page 8-108.

6.) Carefully secure the cables with new cable tie wraps.

7) Return the cabinet cage assembly to the system, reconnect the cables (previously disconnected), close the cabinet cage door and fasten securely with the two latches.
Refer to the 8-6-1-4 "Cabinet Cage Assembly Closing and Installation Procedure" on page 8-104.

8) Return the front cover, as described in the 8-2-6-4 "Front Cover Installation Procedure" on page 8-18.

9) Return the left and right side covers, as described in the 8-2-3-4 "Left Side Cover Installation Procedure" on page 8-7 and See “Right Side Cover Installation Procedure” on page 5..

10.) Turn ON power to the system.

11.) Proceed to perform the following functionality tests:

- 10-6-4 "Grounding Continuity" on page 10-23
- 10-6-5 "Chassis Current Leakage Test" on page 10-24

8-6-4 Hard Disk Replacement Procedure

NOTE: When replacing the BEP or Hard Disk, one must either obtain new access codes that will fit the system ID which is programmed on the BEP, or program the BEP system ID to fit the access codes already registered in the Hard Disk. Only qualified personnel should perform these tasks.

8-6-4-1 Tools

Use the appropriate flat and Phillips-type screwdrivers as indicated in the Hard Disk replacement procedure.

8-6-4-2 Time Required

10 minutes

8-6-4-3 Preparation

Shut down the Vivid S5 N or Vivid S6 N ultrasound unit, as described in *Chapter 3* - System Setup.

8-6-4-4 Hard Disk Removal Procedure

1) Remove the left and right side covers, as described in the 8-2-3-3 "Left Side Cover Removal Procedure" on page 8-6 and 8-2-2-3 "Right Side Cover Removal Procedure" on page 8-5.
2) Remove the front cover, as described in the 8-2-6-3 "Front Cover Removal Procedure" on page 8-16.
3) Open and remove the cabinet cage assembly and place it on a stable surface, as described in 8-6-1 "Opening and Removing the Cabinet Cage Assembly" on page 8-98.

NOTE: The Hard Disk has a metal securing plate attached on one side, as shown in Figure 8-140. The plate is used to secure the Hard Disk firmly in position in the cage assembly and also serves as a useful hand grip when removing/inserting the Hard Disk, as described in the following steps.

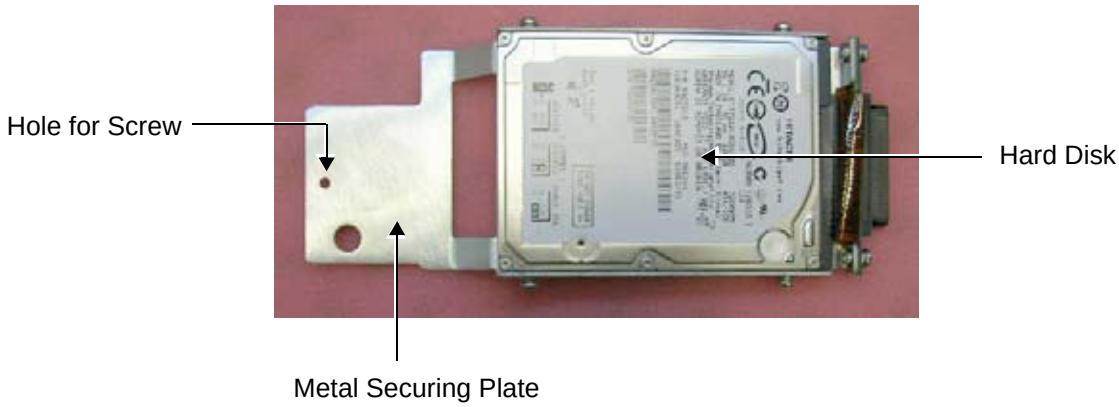


Figure 8-140 Hard Disk with Metal Securing Plate Attached

8-6-4 Hard Disk Replacement Procedure (cont'd)

4) Working from the side of the cage, use a small Phillips screwdriver to loosen and remove the screw from the metal securing plate that holds the Hard Disk in position (as shown in Figure 8-141 below).

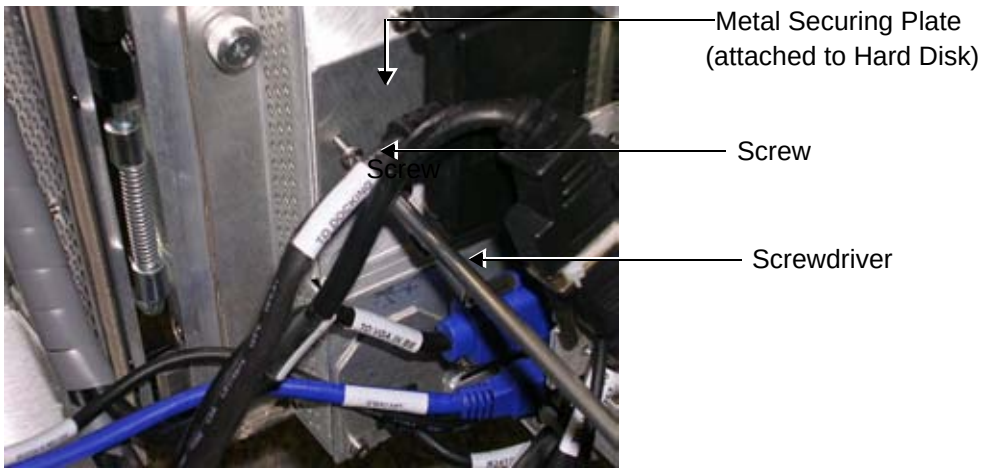


Figure 8-141 Loosening the Screw from the Metal Securing Plate

5) Using a finger and thumb, grip the metal plate firmly and pull to the *left* to slide the Hard Disk straight out of the cage assembly - see Figure 8-142 below.

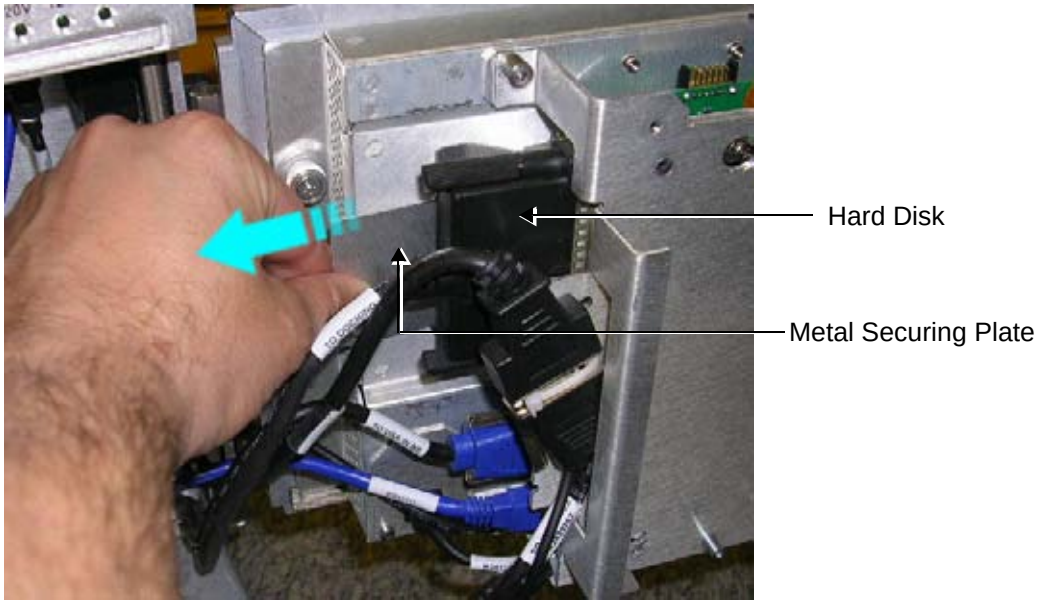


Figure 8-142 Removing the Hard Disk

8-6-4 Hard Disk Replacement Procedure (cont'd)

8-6-4-5 Hard Disk Installation Procedure

NOTE: When replacing the BEP or Hard Disk, one must either obtain new access codes that will fit the system ID which is programmed on the BEP, or program the BEP system ID to fit the access codes already registered in the Hard Disk. Only qualified personnel should perform these tasks.

1) Using a finger and thumb to grip the metal plate firmly, slide the new hard disk into position in the hard disk module holder - see Figure 8-142 on page 8-113.
2) Return and fasten the screw (previously removed) to secure the Hard Disk in position - refer to Figure 8-141 on page 8-113.
3) Return the cabinet cage assembly to the system, reconnect the cables (previously disconnected), close the cabinet cage door and fasten securely with the two latches.
Refer to the 8-6-1-4 "Cabinet Cage Assembly Closing and Installation Procedure" on page 8-104.
4) Return the front cover, as described in the 8-2-6-4 "Front Cover Installation Procedure" on page 8-18.
5) Return the left and right side covers, as described in the 8-2-3-4 "Left Side Cover Installation Procedure" on page 8-7 and 8-2-2-4 "Right Side Cover Installation Procedure" on page 8-5,
6.) Turn ON power to the system.

NOTE: When a new hard disk arrives from the manufacturer, usually it is partitioned and ready for software installation. Refer to Section 8-8 "Software Loading" on page 8-174 for software installation instructions .

NOTE: IMPORTANT - if both the Hard Disk and Back End are being replaced simultaneously, it is necessary to re-configure the LCD type. Refer to the instructions provided in the 8-3-1-4 "Monitor Installation Procedure" on page 8-27. (New instructions TBD)

7.) Proceed to perform the following functionality tests:
- 10-6-4 "Grounding Continuity" on page 10-23
- 10-6-5 "Chassis Current Leakage Test" on page 10-24
- 7-2-4-2-1 "Calibration" on page 7-10
- 7-2-4-1 "Full System Test" on page 7-9

8.) Complete the procedure by setting the display type, as described in "Display Type Setup" on page 6-5.

8-6-5 BEP Replacement Procedure

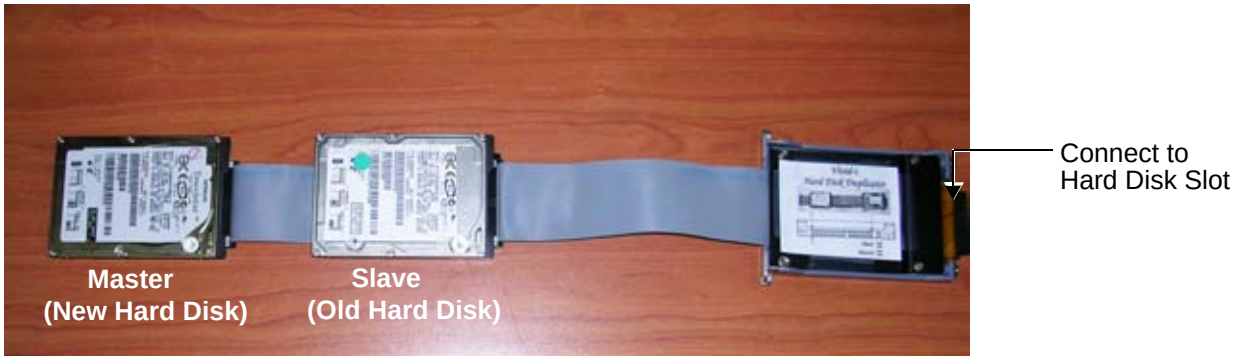


Figure 8-143

CAUTION: BEFORE REPLACING THE BEP, REMEMBER TO PERFORM A FULL INCREMENTAL BACK-UP OF THE ARCHIVE AND USER PRESETS.
For details, refer to the "Software Installation/Upgrade Procedure Overview" on page 8-174

NOTE: It is recommended to replace the battery once every 2 years.

CAUTION

When performing these procedures, take precautions to avoid damage of electrostatic-sensitive components. Always have the ESD wrist strap connected either to the DIB chassis or to the GND plug at the rear of the scanner, and to your hand.

If a battery is present, first remove the battery as it contains stored energy. Refer to "Battery Removal Procedure" on page 8-106.

8-6-5-1 Tools

Use the appropriate Phillips and flat screwdrivers, as indicated in the BEP replacement procedures.

8-6-5-2 Time Required

15 minutes

8-6-5-3 Preparations

Shut down the Vivid S5 N or Vivid S6 N ultrasound unit, as described in *Chapter 3* - System Setup.

8-6-5-4 BEP Removal Procedure

1) Remove the left and right side covers, as described in the 8-2-3-3 "Left Side Cover Removal Procedure" on page 8-6 and 8-2-2-3 "Right Side Cover Removal Procedure" on page 8-5.
2) Remove the front cover, as described in the 8-2-6-3 "Front Cover Removal Procedure" on page 8-16.
3) Open and remove the cabinet cage assembly and place it on a stable surface, as described in 8-6-1 "Opening and Removing the Cabinet Cage Assembly" on page 8-98.
4.) Remove the hard disk, as described in the 8-6-4-4 "Hard Disk Removal Procedure" on page 8-112.
5.) Remove the battery, battery bracket and cable, as described in the 8-6-2-4 "Battery Removal Procedure" on page 8-106 and 8-6-3-4 "Battery Bracket Removal Procedure" on page 8-109.

8-6-5 BEP Replacement Procedure (cont'd)

6) Cut the plastic cable tie wrap, as indicated in Figure 8-144.

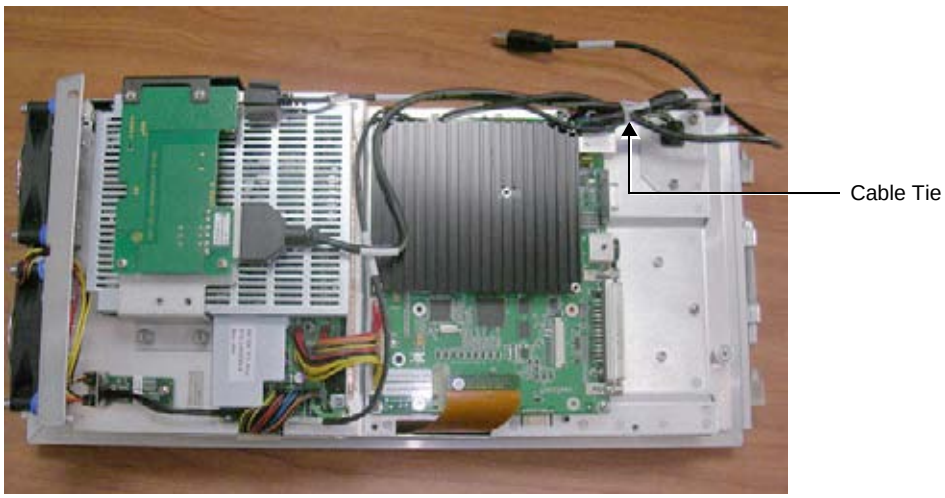


Figure 8-144 Location of Cable Tie

7) Carefully disconnect the Keyboard cable from the BEP by removing the Phillips screw from the bracket that holds the cable connector in place - see Figure 8-145. (The Ground cable is on top, so take care not to damage the wires inside the cable).

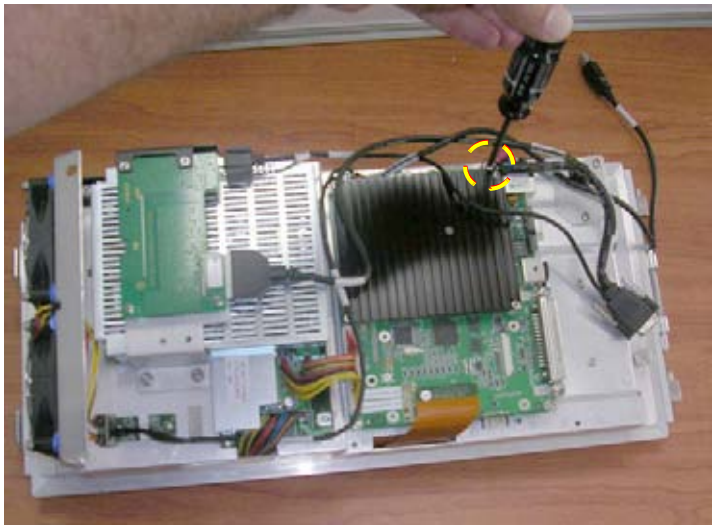


Figure 8-145 Keyboard Cable Fastened with Screw

8-6-5 BEP Replacement Procedure (cont'd)

8) Proceed to disconnect the following cables from their connectors on the BEP (refer to Figure 8-146):

a.) Disconnect the Fan-to-BEP power cable
b.) Disconnect the RFI-to-BEP Flex cable
c.) Disconnect the DC/DC-to-BEP power cable
d.) Disconnect the USB cable

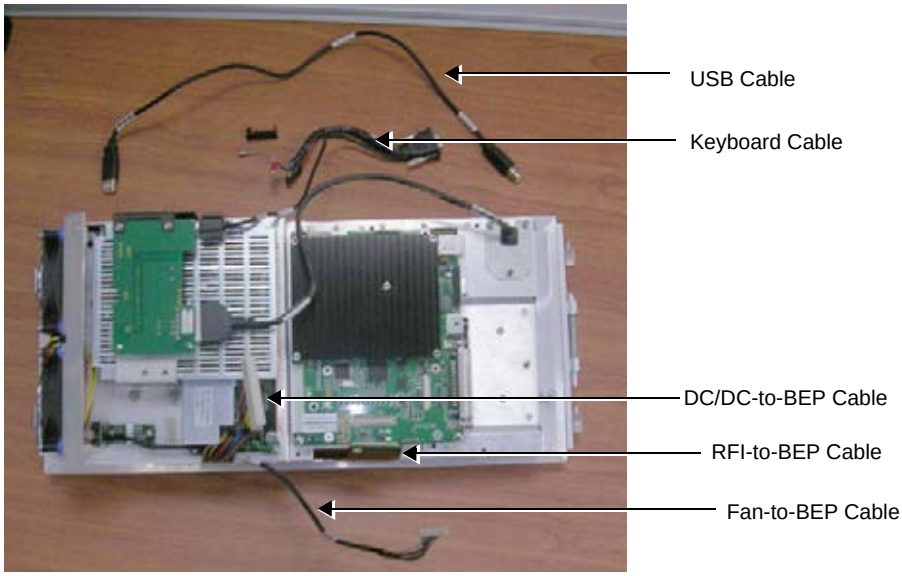


Figure 8-146 Cables Disconnected from the BEP

9) Loosen and remove the three screws that fasten the BEP to the cage assembly (see Figure 8-147).

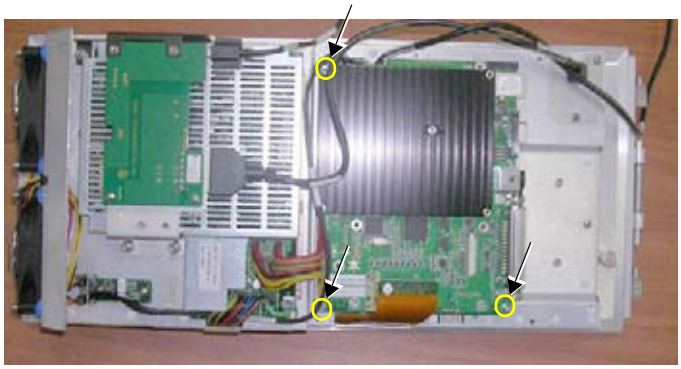


Figure 8-147 BEP Securing Screws

8-6-5 BEP Replacement Procedure (cont'd)

10) Carefully lift the BEP out of the cage assembly and remove it from the system, as shown in Figure 8-148 below.

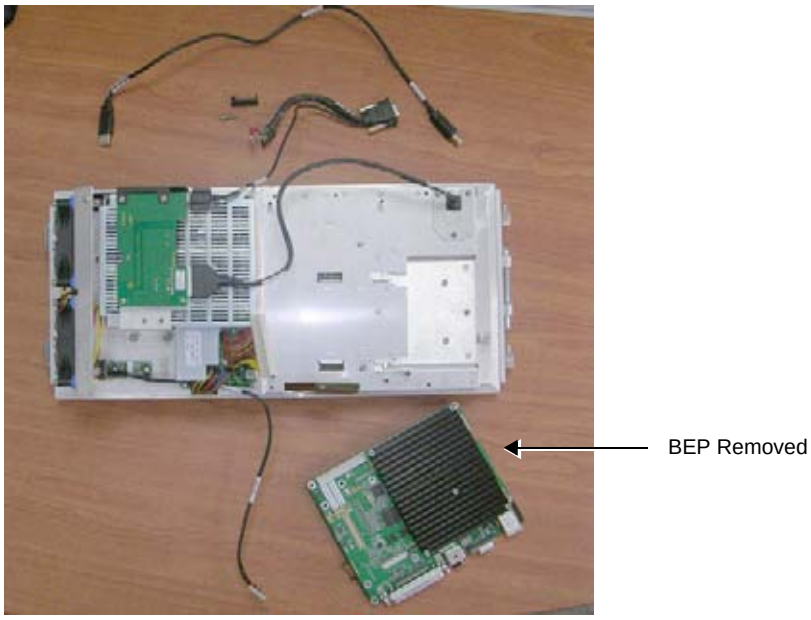


Figure 8-148 BEP Removed from the Cage Assembly

8-6-5 BEP Replacement Procedure (cont'd)

8-6-5-5 BEP Installation Procedure

1) Carefully return the new BEP to the correct position in the cage assembly - refer to Figure 8-148 on page 8-118.

NOTE: IMPORTANT - When replacing the BEP or Hard Disk, one must either obtain new access codes that will fit the system ID which is programmed on the BEP, or program the BEP system ID to fit the access codes already registered in the Hard Disk. Only qualified personnel should perform these tasks.

2) Check that the BEP is seated correctly then return and fasten the three screws (previously removed) to secure the BEP to the cage assembly - refer to Figure 8-147 on page 8-117.

3) Proceed to reconnect the following cables to their connectors on the BEP (refer to Figure 8-146):

   a.) Reconnect the Fan-to-BEP power cable

   b.) Reconnect the RFI-to-BEP Flex cable.

   c.) Reconnect the DC/DC-to-BEP power cable.

   d.) Reconnect the USB cable

4) Carefully reconnect the Keyboard cable to the BEP; return and tighten the screw on the bracket to hold the cable connector in place - see Figure 8-145. Make sure that the Ground cable is properly seated so that it is flush with the top of the bracket (push down if necessary, taking care not to damage the wires inside the cable).

5.) Secure the cables with a plastic cable tie wrap, as indicated in Figure 8-144 on page 8-116.

6.) Return the battery, battery bracket and cable, as described in the *8-6-2-5 - Battery Installation Procedure* and 8-6-3-5 "Battery Bracket Installation Procedure" on page 8-111.

7.) Return the hard disk, as described in the 8-6-4-5 "Hard Disk Installation Procedure" on page 8-114.

8) Return the cabinet cage assembly to the system, reconnect the cables (previously disconnected), close the cabinet cage door and fasten securely with the two latches.
Refer to the 8-6-1-4 "Cabinet Cage Assembly Closing and Installation Procedure" on page 8-104.

9) Return the front cover, as described in the 8-2-6-4 "Front Cover Installation Procedure" on page 8-18.

   e.) Return the left and right side covers, as described in the 8-2-3-4 "Left Side Cover Installation Procedure" on page 8-7 and 8-2-2-4 "Right Side Cover Installation Procedure" on page 8-5.

10.) Turn ON the system and boot-up.

11.) Perform the PMC Update procedure, as described in 8-8-8 "Installation of PMC Version" on page 8-196.

12.) Perform the BIOS Update procedure, as described in *8-8-3 "BIOS Firmware Update" on page 8-181*.

8-6-5 BEP Replacement Procedure (cont'd)

13.) Proceed to perform the following functionality tests:

- 10-6-4 "Grounding Continuity" on page 10-23
- 10-6-5 "Chassis Current Leakage Test" on page 10-24
- 7-2-4-2-1 "Calibration" on page 7-10
- 7-2-4-1 "Full System Test" on page 7-9
- 4-3-4-1 "USB Test" on page 4-35
- 4-3-4-2 "Standby Test" on page 4-35
- 4-3-1-3 "System SN Test" on page 4-20

14.) Complete the procedure by setting the display type, as described in "Display Type Setup" on page 6-5.

8-6-6 ECG Module Assembly Replacement Procedure

CAUTION

When performing these procedures, take precautions to avoid damage of electrostatic-sensitive components. Always have the ESD wrist strap connected either to the DIB chassis or to the GND plug at the rear of the scanner, and to your hand.

If a battery is present, first remove the battery as it contains stored energy. Refer to “Battery Removal Procedure” on page 8-106.

8-6-6-1 Tools

Use the appropriate flat screwdriver, as indicated in the ECG Module Assembly replacement procedure.

8-6-6-2 Time Required

10 minutes

8-6-6-3 Preparation

Shut down the Vivid S5 N or Vivid S6 N ultrasound unit, as described in *Chapter 3* - System Setup.

8-6-6-4 ECG Module Assembly Removal Procedure

1) Remove the system left and right side covers, as described in the 8-2-3-3 "Left Side Cover Removal Procedure" on page 8-6 and 8-2-2-3 "Right Side Cover Removal Procedure" on page 8-5.
2) Remove the system front cover, as described in 8-2-6-3 "Front Cover Removal Procedure" on page 8-16.
3) Open and remove the cabinet cage assembly and place it on a stable surface, as described in 8-6-1 "Opening and Removing the Cabinet Cage Assembly" on page 8-98.

NOTE: The location of the ECG Module Assembly is shown in Figure 8-149

.

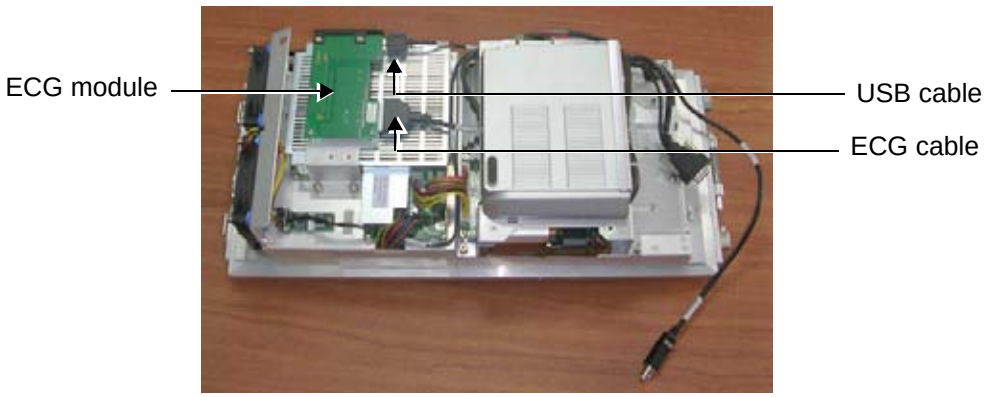


Figure 8-149 ECG Module Assembly

8-6-6 ECG Module Assembly Replacement Procedure (cont'd)

4) Loosen the three screws on the fastening bracket, as indicated in Figure 8-150. (Access to one of the screws is via the battery bracket, as shown).

Figure 8-150 Loosening Screws on the Fastening Bracket

5) Carefully slide the ECG module assembly and fastening bracket sideways to the *right* (to move out of the fixed position) and carefully lift it *upwards* and tilt it over, as shown in Figure 8-151

.

Figure 8-151 Removing the ECG Module Assembly and Bracket

6) Disconnect the USB cable from the USB connector on the ECG module (refer to Figure 8-149 on page 8-121).

7) Disconnect the ECG cable from the ECG connector on the ECG module (refer to Figure 8-149 on page 8-121).

8-6-6 ECG Module Assembly Replacement Procedure (cont'd)

When disconnecting the cable, it is necessary to press the cable connector latch *down* (Figure 8-152):

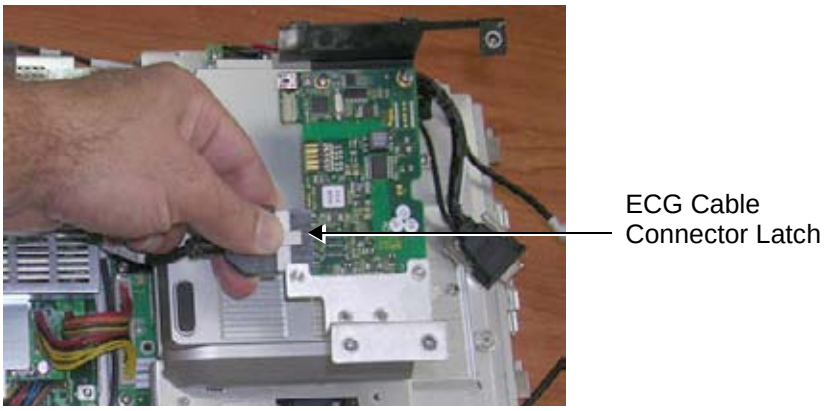


Figure 8-152 Disconnecting the ECG Cable

8) Remove the ECG Module Assembly from the system - see Figure 8-153 on page 8-123.

Figure 8-153 ECG Module Assembly Removed

8-6-6-5 ECG Module Assembly Installation Procedure

1) Return a new ECG Module assembly (and attached fastening bracket) to the cabinet cage assembly and lay it upside down (on top of the battery), as shown in Figure 8-152 on page 8-123.
2) Re-connect the ECG cable (seen in Figure 8-155) to the ECG Module assembly (push it until it clicks into position).
3) Re-connect the USB cable to the ECG Module assembly - seen in Figure 8-155.

8-6-6 ECG Module Assembly Replacement Procedure (cont'd)

4) Turn the ECG Module assembly (with bracket attached) over, ready to place it in the correct location as shown in Figure 8-155.

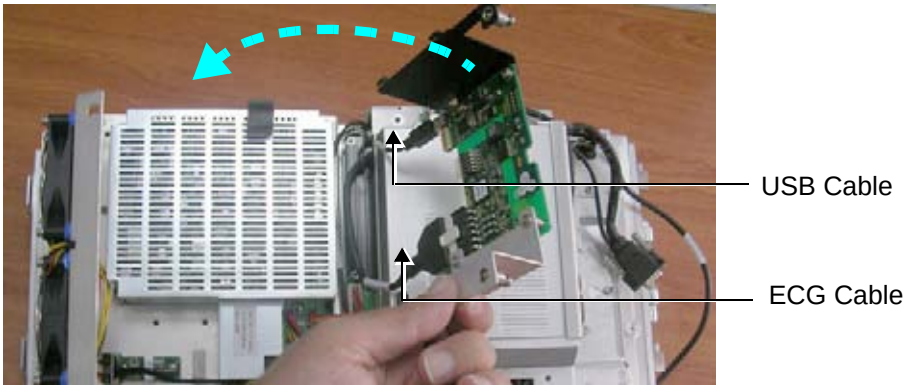


Figure 8-154 Return the ECG Module Assembly and Bracket

5.) Carefully slide the assembly and fastening bracket sideways to the *right* until it is seated in the correct position. Make sure the securing bracket holes are properly aligned - Figure 8-155.

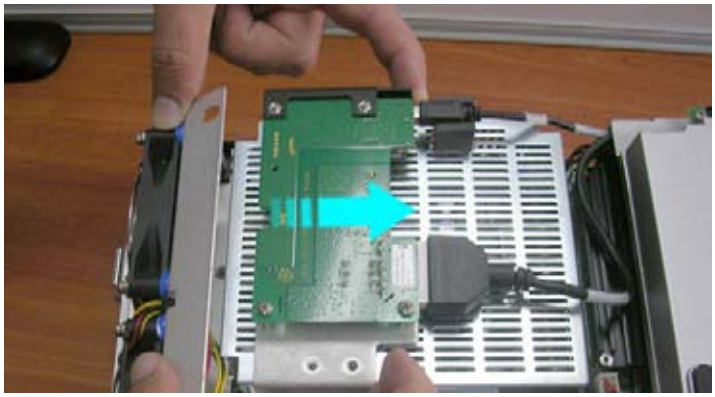


Figure 8-155 Sliding the ECG Module Assembly and Bracket into Position

6) Fasten the three screws on the bracket to secure the ECG Module assembly to the cabinet cage assembly (refer to Figure 8-150 on page 8-122).

7) Return the cabinet cage assembly to the system, reconnect the cables (previously disconnected), close the cabinet cage door and fasten securely with the two latches.
Refer to the 8-6-1-4 "Cabinet Cage Assembly Closing and Installation Procedure" on page 8-104.

8) Return the front cover, as described in the 8-2-6-4 "Front Cover Installation Procedure" on page 8-18.

9) Return the left and right side covers, as described in the 8-2-3-4 "Left Side Cover Installation Procedure" on page 8-7 and 8-2-2-4 "Right Side Cover Installation Procedure" on page 8-5.

10.) Turn ON power to the system.

8-6-6 ECG Module Assembly Replacement Procedure (cont'd)

11.) Proceed to perform the following functionality tests:

- 10-6-6 "Isolated Patient Lead (Source) Leakage – Lead-to-Ground" on page 10-26
- 10-6-7 "Isolated Patient Lead (Source) Leakage – Lead-to-Lead" on page 10-27
- 10-6-8 "Isolated Patient Lead (Sink) Leakage - Isolation Test" on page 10-27
- 10-6-4 "Grounding Continuity" on page 10-23
- 10-6-5 "Chassis Current Leakage Test" on page 10-24
- 7-2-4-2-1 "Calibration" on page 7-10
- 4-3-1-7 "ECG Test" on page 4-22

8-6-7 DC-to-DC Power Supply Replacement Procedure

NOTE: The DC-to-DC Power Supply is also referred to as the HVPS (High Voltage Power Supply).

CAUTION

When performing these procedures, take precautions to avoid damage of electrostatic-sensitive components. Always have the ESD wrist strap connected either to the DIB chassis or to the GND plug at the rear of the scanner, and to your hand.

If a battery is present, first remove the battery as it contains stored energy. Refer to 8-6-2-4 "Battery Removal Procedure" on page 8-106.

8-6-7-1 Tools

Use the appropriate flat and Phillips-type screwdrivers, as indicated in the DC-to-DC Power Supply replacement procedure.

8-6-7-2 Time Required

15 minutes

8-6-7-3 Preparation

Shut down the Vivid S5 N or Vivid S6 N ultrasound unit, as described in *Chapter 3* - System Setup.

8-6-7-4 DC-to-DC Power Supply Removal Procedure

1) Remove the left and right side covers, as described in the 8-2-3-3 "Left Side Cover Removal Procedure" on page 8-6 and 8-2-2-3 "Right Side Cover Removal Procedure" on page 8-5.
2) Remove the front cover, as described in the 8-2-6-3 "Front Cover Removal Procedure" on page 8-16.
3) Open and remove the cabinet cage assembly and place it on a stable surface, as described in 8-6-1 "Opening and Removing the Cabinet Cage Assembly" on page 8-98.
4) Remove the ECG module assembly, as described in the “ECG Module Assembly Removal Procedure” on page 8-121.
5) Loosen and remove the 2 screws that secure the metal plate (that covers the RFI power cable) to the side of the cabinet cage assembly and remove the plate, as shown in Figure 8-156 below.

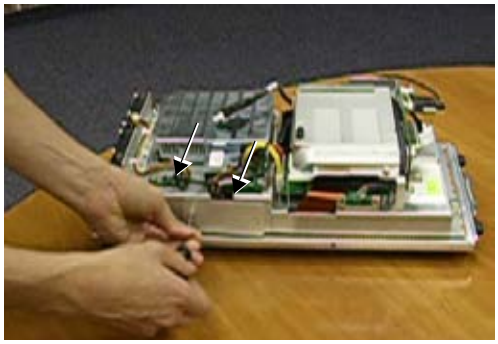


Figure 8-156 Removing the Metal Plate

8-6-7 DC-to-DC Power Supply Replacement Procedure (cont'd)

6.) Loosen and remove the 5 screws that secure the DC-to-DC Power Supply to the cage assembly (see Figure 8-157 below).

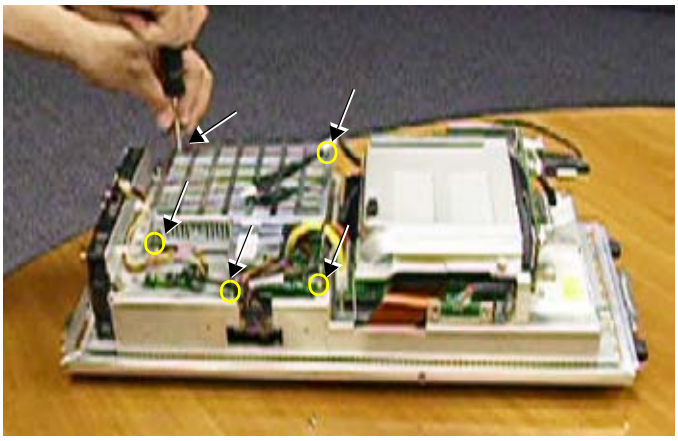


Figure 8-157 Loosening the DC-to-DC PS Securing Screws

7) Disconnect both of the Power Supply cables from the DC-to-DC Power Supply, as shown below: HVPS-to-RFI (shown *left* in Figure 8-158) and HVPS-to-BEP (shown right in Figure 8-158).

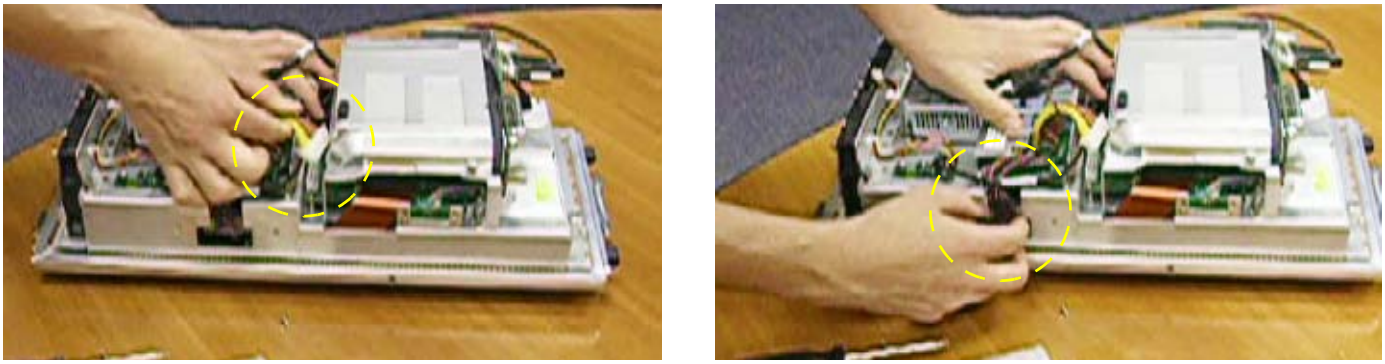


Figure 8-158 Disconnecting the DC Power Supply Cables

8) Using both hands, carefully lift the DC-to-DC power supply *upwards* and remove it from the cage assembly, as shown in Figure 8-159 below.

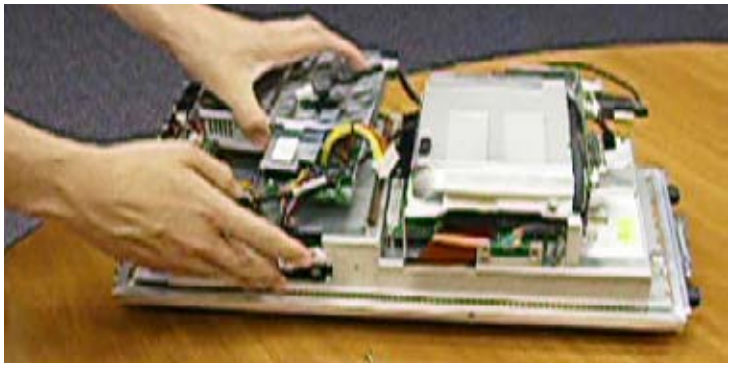


Figure 8-159 Removing the DC-to-DC Power Supply

8-6-7 DC-to-DC Power Supply Replacement Procedure (cont'd)

8-6-7-5 DC-to-DC Power Supply Installation Procedure

1) Return a new DC-to-DC power supply to its correct position in the cage assembly - refer to Figure 8-159 on page 8-127.
2) Reconnect each of the two Power Supply cables to the DC-to-DC Power Supply (previously disconnected - refer to Figure 8-158 on page 8-127:
(HVPS-to-RFI - shown *left*) and (HVPS-to-BEP - shown right).
3.) Return and fasten the 5 screws (previously removed) to secure the DC-to-DC Power Supply to the cage assembly (see Figure 8-157 on page 8-127).
4) Return the metal plate (that covers the RFI power cable) to the side of the cabinet cage assembly and fasten securely with the 2 screws (previously removed) - refer to Figure 8-156 on page 8-126.
5) Return the ECG module assembly, as described in the 8-6-6-5 "ECG Module Assembly Installation Procedure" on page 8-123.
6) Return the cabinet cage assembly to the system, reconnect the cables (previously disconnected), close the cabinet cage door and fasten securely with the two latches.
Refer to the 8-6-1-4 "Cabinet Cage Assembly Closing and Installation Procedure" on page 8-104.
7) Return the front cover, as described in the 8-2-6-4 "Front Cover Installation Procedure" on page 8-18.
8) Return the left and right side covers, as described in the 8-2-3-4 "Left Side Cover Installation Procedure" on page 8-7 and 8-2-2-4 "Right Side Cover Installation Procedure" on page 8-5.
9.) Turn ON power to the system.
10.) Proceed to perform the following functionality tests:
   - 10-6-4 "Grounding Continuity" on page 10-23
   - *10-6-5 - Chassis Current Leakage Test*
   - 7-2-4-2-1 "Calibration" on page 7-10
   - 7-2-4-1 "Full System Test" on page 7-9
   - 4-3-1-8 "Front End Tests" on page 4-23
   - 4-3-1-9 "Visual Test" on page 4-31

8-6-8 PSB (Probe Select Board) Board Replacement Procedure

NOTE: When tightening screws, ***do not overtighten or use excessive force****.*

CAUTION

When performing these procedures, take precautions to avoid damage of electrostatic-sensitive components. Always have the ESD wrist strap connected either to the DIB chassis or to the GND plug at the rear of the scanner, and to your hand.

If a battery is present, first remove the battery as it contains stored energy. Refer to 8-6-2-4 "Battery Removal Procedure" on page 8-106.

8-6-8-1 Tools

Use the appropriate flat and Phillips-type screwdrivers, as indicated in the PSB Board replacement procedure.

8-6-8-2 Time Required

15 minutes

8-6-8-3 Preparation

Shut down the Vivid S5 N or Vivid S6 N ultrasound unit, as described in *Chapter 3* - System Setup.

8-6-8-4 PSB Board Removal Procedure

1) Remove the system left and right side covers, as described in the 8-2-3-3 "Left Side Cover Removal Procedure" on page 8-6 and 8-2-2-3 "Right Side Cover Removal Procedure" on page 8-5.
2) Remove the system front cover, as described in 8-2-6-3 "Front Cover Removal Procedure" on page 8-16.
3) Open and remove the cabinet cage assembly and place it on a stable surface, as described in 8-6-1 "Opening and Removing the Cabinet Cage Assembly" on page 8-98.
4.) Remove the three Phillips screws that secure the ECG Connector to the PSB Board, as indicated in Figure 8-160.

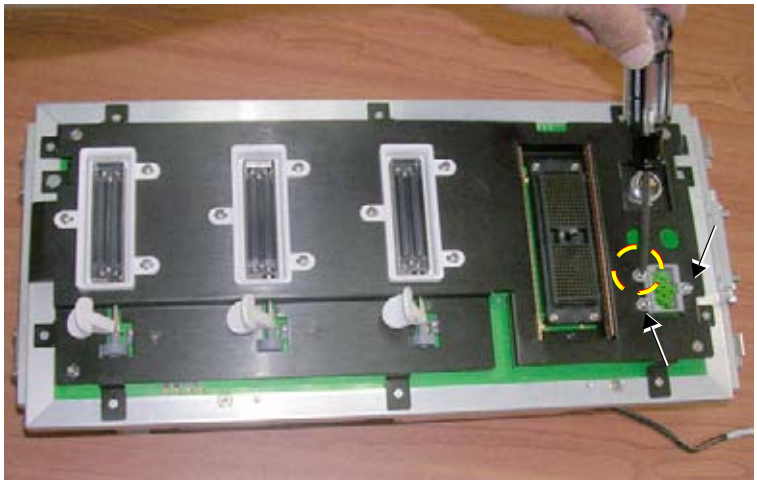


Figure 8-160 Screws Securing ECG Connector to the PSB Board

8-6-8 PSB (Probe Select Board) Board Replacement Procedure (cont'd)

5) Proceed as follows:

a.) Lift the ECG Connector up to expose the bracket, as shown in Figure 8-161.

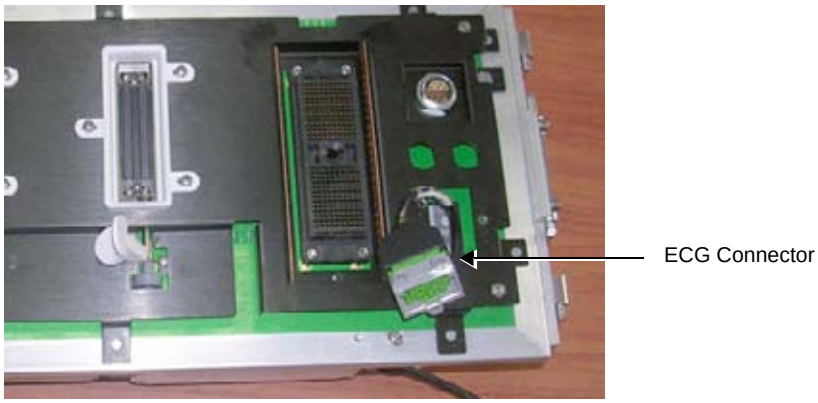


Figure 8-161 ECG Connector Exposed

b.) Using a flat screwdriver, carefully ease the plastic bracket from the end of the connector and remove the bracket, as shown in Figure 8-162:

Figure 8-162 Removing the Plastic Bracket

8-6-8 PSB (Probe Select Board) Board Replacement Procedure (cont'd)

c.) Push the ECG Connector all the way down through the rectangular hole in the PSB Board (see Figure 8-163).

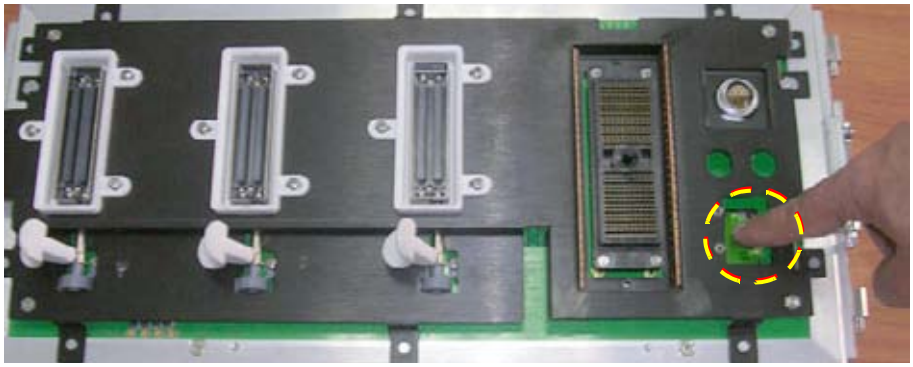


Figure 8-163 Pushing the ECG Connector Down

6.) Unfold the cabinet cage assembly (by unfastening each of the two thumbscrews), as described in 8-6-1 "Opening and Removing the Cabinet Cage Assembly" on page 8-98 (see step 11 on page 8-101). Turn the cage assembly into the position shown in Figure 8-164

Figure 8-164 Cabinet Cage Assembly Open

8-6-8 PSB (Probe Select Board) Board Replacement Procedure (cont'd)

7.) Loosen and remove the screw that secures the PIB-to-PSB flex cable in position and disconnect the flex cable (see Figure 8-165).

Figure 8-165 Disconnecting the PIB-to-PSB Flex Cable

8.) Squeeze together the two hinged latches (that secure the PSB to the cage assembly) to release the spring locking mechanism - then remove the PSB Board (Figure 8-166).

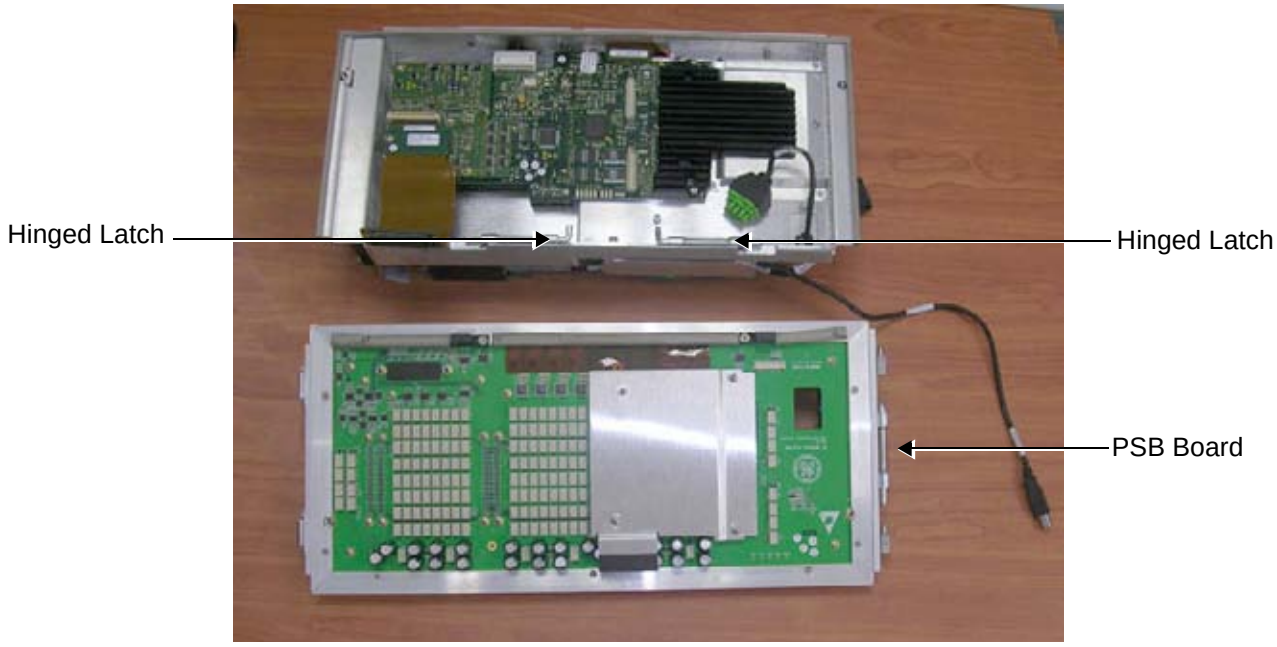


Figure 8-166 PSB Board Removed

8-6-8 PSB (Probe Select Board) Board Replacement Procedure (cont'd)

8-6-8-5 PSB Board Installation Procedure

1.) Return a new PSB Board to the cabinet cage assembly and secure in the correct position by squeezing together the two hinged latches (see Figure 8-166, above) to release the spring locking mechanism. Release the latches and make sure the PSB Board is firmly locked in place on the cage assembly.

2.) Re-connect the PIB-to-PSB flex cable and fasten in position using the screw previously removed - refer to Figure 8-165 on page 8-132.

3.) Push the ECG connector up through the rectangular hole in the PSB Board (refer to Figure 8-163 on page 8-131).

4) Fold the cage to the closed position and secure by fastening each of the two thumbscrews.

5.) Return the plastic bracket (previously removed) to the end of the connector - push into position making sure it is fitting properly on all sides - refer to Figure 8-162 on page 8-130.

6.) Push the ECG connector down to the correct position and make sure it is properly seated (refer to Figure 8-161).

7) Fold the cabinet cage assembly in the closed position and secure by fastening each of the two thumbscrews.

8) Return the cabinet cage assembly to the system, reconnect the cables (previously disconnected), close the cabinet cage door and fasten securely with the two latches.
Refer to the 8-6-1-4 "Cabinet Cage Assembly Closing and Installation Procedure" on page 8-104.

9) Return the front cover, as described in the 8-2-6-4 "Front Cover Installation Procedure" on page 8-18.

10) Return the left and right side covers, as described in the 8-2-3-4 "Left Side Cover Installation Procedure" on page 8-7 and 8-2-2-4 "Right Side Cover Installation Procedure" on page 8-5.

11.) Turn ON power to the system.

12.) Proceed to perform the following functionality tests:

- 10-6-4 "Grounding Continuity" on page 10-23
- *10-6-5 - Chassis Current Leakage Test*
- 7-2-4-2-1 "Calibration" on page 7-10
- 7-2-4-1 "Full System Test" on page 7-9
- 4-3-1-8 "Front End Tests" on page 4-23
- 4-3-1-9 "Visual Test" on page 4-31

8-6-9 PIB (Probe Interface Board) Board Replacement Procedure

CAUTION

When performing these procedures, take precautions to avoid damage of electrostatic-sensitive components. Always have the ESD wrist strap connected either to the DIB chassis or to the GND plug at the rear of the scanner, and to your hand.

If a battery is present, first remove the battery as it contains stored energy. Refer to "Battery Removal Procedure" on page 8-106.

8-6-9-1 Tools

Use the appropriate flat and Phillips-type screwdrivers as indicated in the PIB replacement procedure.

8-6-9-2 Time Required

10 minutes

8-6-9-3 Preparation

Shut down the Vivid S5 N or Vivid S6 N ultrasound unit, as described in *Chapter 3* - System Setup.

8-6-9-4 PIB Board Removal Procedure

1) Remove the system left and right side covers, as described in the "Left Side Cover Removal Procedure" on page 8-6 and "Right Side Cover Removal Procedure" on page 8-5.
2) Remove the system front cover, as described in the "Front Cover Removal Procedure" on page 8-16.
3) Remove the cabinet cage assembly from the system, open the cage and carefully place it on a stable surface, as described in the "Cabinet Cage Assembly Opening and Removal Procedure" on page 8-98.
4.) Unfold the cabinet cage assembly, as described in "Opening and Removing the Cabinet Cage Assembly" on page 8-98 (see step 11 on page 8-101).
5) Remove the screw that secures the PIB-to-PSB flex cable in position (Figure 8-167).

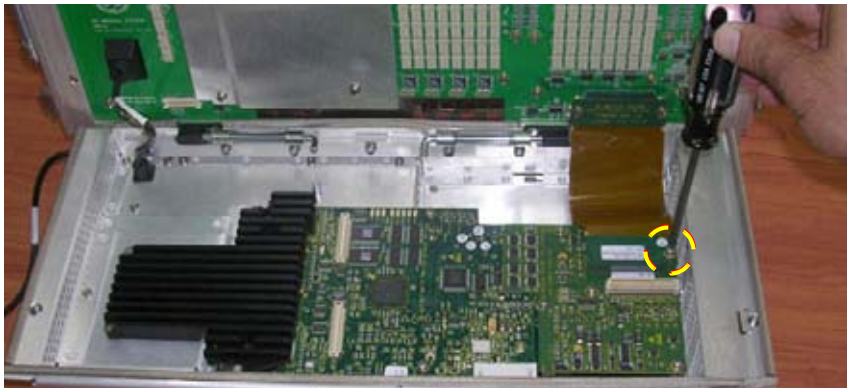


Figure 8-167 Unscrewing the PIB-to-PSB Flex Cable

8-6-9 PIB (Probe Interface Board) Board Replacement Procedure (cont'd)

6.) Disconnect the flex cable from the PIB Board.

7.) Loosen and remove the five screws holding the PIB Board in position (see Figure 8-168).

Figure 8-168 Removing the PIB Board

NOTE: There are 3 long and 2 short screws. (The other short screw seen in Figure 8-168 is the one removed when disconnecting the PIB-to-PSB flex cable.

8.) Remove the PIB Board from the cage assembly.

Figure 8-169 PIB Board Removed

8-6-9 PIB (Probe Interface Board) Board Replacement Procedure (cont'd)

8-6-9-5 PIB Board Installation Procedure

1) Return a new PIB Board to the appropriate location on the cabinet cage assembly - refer to Figure 8-168.
2.) Return and fasten the five screws (previously removed) to secure the PIB Board in position.
3.) Reconnect the PIB-to-PSB flex cable to the PIB Board, then return and fasten the screw (previously removed) to secure the flex cable in position (Figure 8-167).
4) Fold the cabinet cage assembly in the closed position and secure by fastening each of the two thumbscrews.
5) Return the cabinet cage assembly to the system, reconnect the cables (previously disconnected), close the cabinet cage door and fasten securely with the two latches.
Refer to the 8-6-1-4 "Cabinet Cage Assembly Closing and Installation Procedure" on page 8-104.
6) Return the Vivid S6 N front cover, as described in the 8-2-6-4 "Front Cover Installation Procedure" on page 8-18.
7) Return the Vivid S6 N left and right side covers, as described in the 8-2-3-4 "Left Side Cover Installation Procedure" on page 8-7 and 8-2-2-4 "Right Side Cover Installation Procedure" on page 8-5.
8.) Turn ON power to the system.
9.) Proceed to perform the following functionality tests:
- 10-6-4 "Grounding Continuity" on page 10-23
- *10-6-5 - Chassis Current Leakage Test*
- 7-2-4-2-1 "Calibration" on page 7-10
- 7-2-4-1 "Full System Test" on page 7-9
- 4-3-1-8 "Front End Tests" on page 4-23
- 4-3-1-9 "Visual Test" on page 4-31

8-6-10 TR32 and RFI Boards Replacement Procedure

CAUTION

When performing these procedures, take precautions to avoid damage of electrostatic-sensitive components. Always have the ESD wrist strap connected either to the DIB chassis or to the GND plug at the rear of the scanner, and to your hand.

If a battery is present, first remove the battery as it contains stored energy. Refer to “Battery Removal Procedure” on page 8-106.

8-6-10-1 Tools

Use the appropriate Phillips and flat screwdrivers, as indicated in the board replacement procedures.

8-6-10-2 Time Required

15 minutes

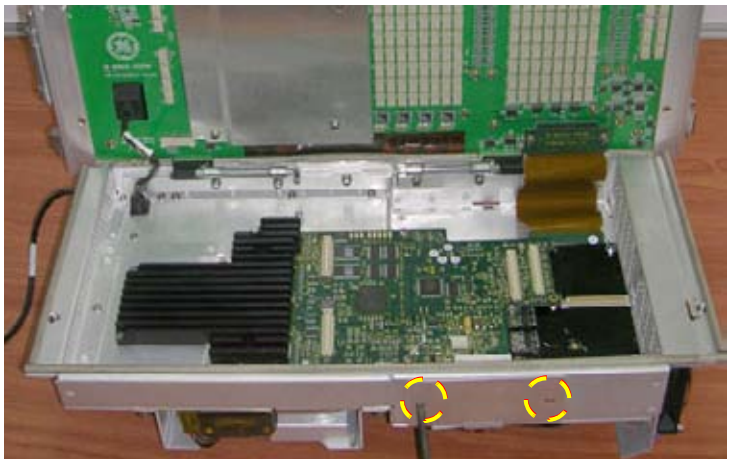
8-6-10-3 Preparations

Shut down the Vivid S5 N or Vivid S6 N ultrasound unit, as described in *Chapter 3* - System Setup.

8-6-10-4 TR32 and RFI Boards Removal Procedure

1) Remove the system left and right side covers, as described in the 8-2-3-3 "Left Side Cover Removal Procedure" on page 8-6 and 8-2-2-3 "Right Side Cover Removal Procedure" on page 8-5.
2) Remove the system front cover, as described in the 8-2-6-3 "Front Cover Removal Procedure" on page 8-16.
3) Open and remove the cabinet cage assembly and place it on a stable surface, as described in 8-6-1 "Opening and Removing the Cabinet Cage Assembly" on page 8-98.
4.) Unfold the cabinet cage assembly, as described in 8-6-1 "Opening and Removing the Cabinet Cage Assembly" on page 8-98 (see step 11 on page 8-101).
5.) Remove the PIB Board, as described in the 8-6-9-4 "PIB Board Removal Procedure" on page 8-134.
6) Loosen and remove the 2 screws that secure the metal plate (that covers the RFI power cable) to the side of the cabinet cage assembly and remove the plate, as shown in Figure 8-170 below.

8-6-10 TR32 and RFI Boards Replacement Procedure (cont'd)



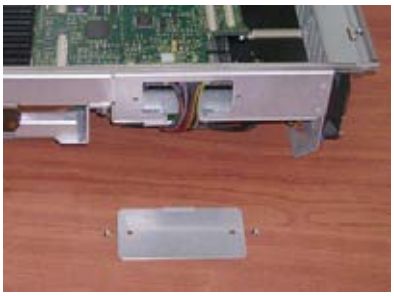


Figure 8-170 Removing the Metal Plate

7) Loosen and remove the 10 Phillips screws that fasten the RFI board in position - Figure 8-171.

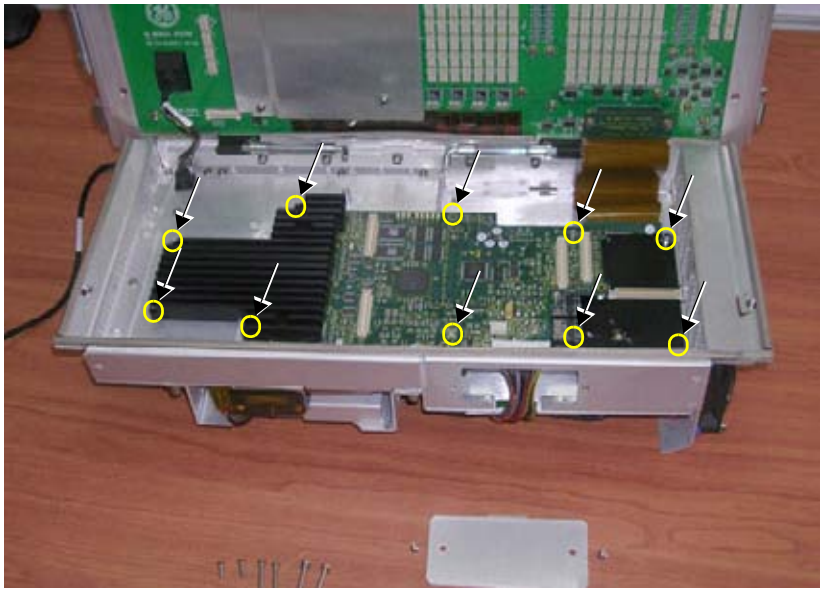


Figure 8-171 Removing Securing Screws from RFI Board

NOTE: There are 2 long, 2 medium length, 2 short, and 4 very short screws.

8) Disconnect the power cable from the RFI Board - see Figure 8-172.

9) Disconnect the BEP-to-RFI flex cable from the cable connector on RFI Board, as shown in Figure 8-172 below.

8-6-10 TR32 and RFI Boards Replacement Procedure (cont'd)

Figure 8-172 Disconnecting the Cables from the RFI Board

NOTE: Although the securing screws have been removed from the RFI Board (step 7), it is still secured on the cabinet cage assembly by way of a metal spline. It is necessary to perform the next step in order to release the RFI Board and so facilitate its removal from the cage assembly.

10) Using a flat screwdriver, push down the metal spline to release the RFI Board from the fastened position, as shown in Figure 8-173.

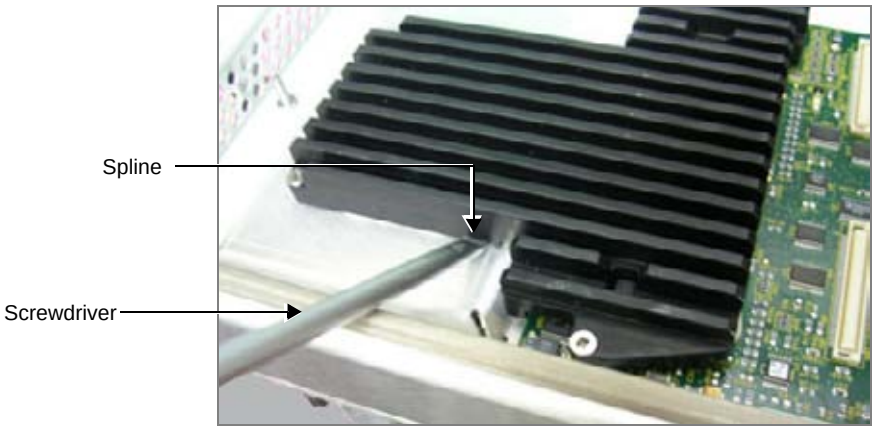


Figure 8-173 Releasing the Spline

11) Carefully lift the RFI and TR32 Board out of the cage assembly - together with the Heat Sink - as shown in Figure 8-174 below.
(The RFI and TR32 Boards are seated together in the system as one unit).

8-6-10 TR32 and RFI Boards Replacement Procedure (cont'd)

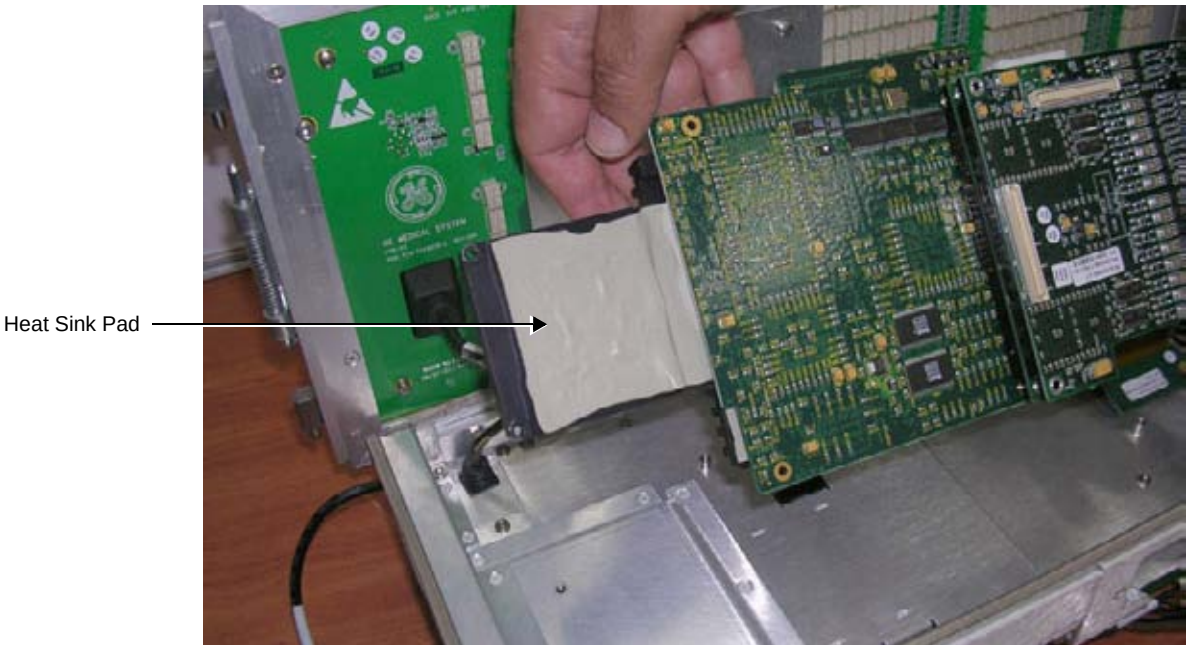


Figure 8-174 Removing the RFI and TR32 Boards

NOTE: The Heat Sink pad on the RFI Board (shown in Figure 8-174, above) is adhered in position and should be re-used.

12.) Detach the RFI Board from the TR32 Boards (separate by gently pulling them apart), as shown in Figure 8-175 below.

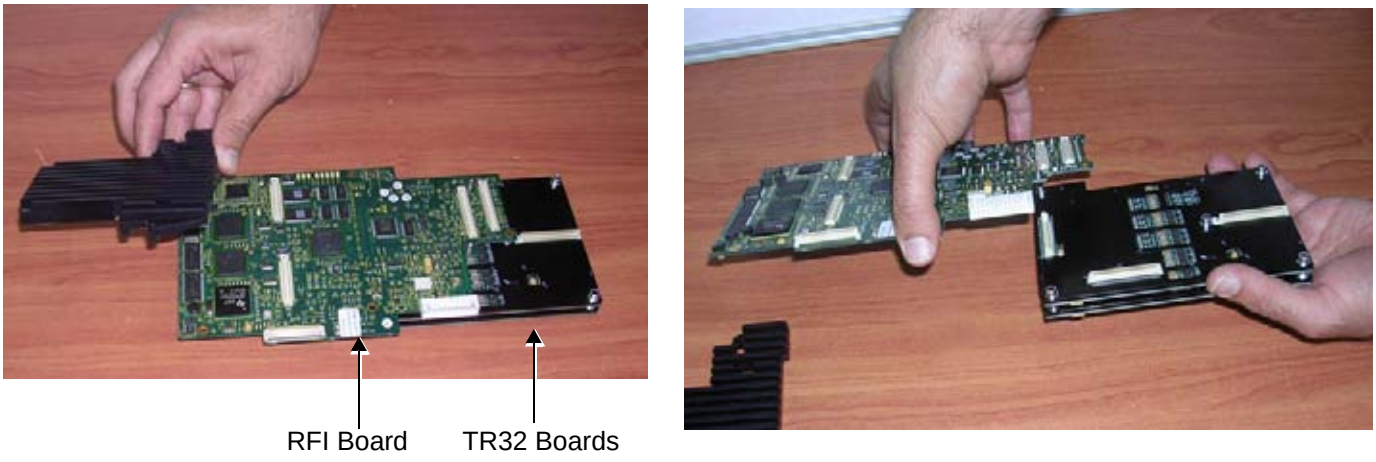


Figure 8-175 Removing the RFI Board from the TR32 Boards

8-6-10 TR32 and RFI Boards Replacement Procedure (cont'd)

13) Separate the two TR32 Boards from each other, as shown in Figure 8-176 below

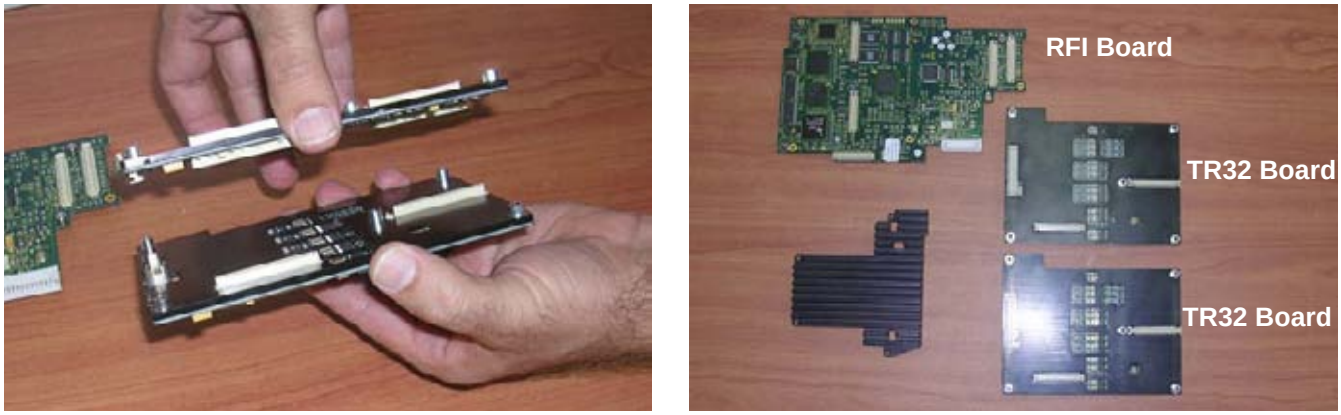
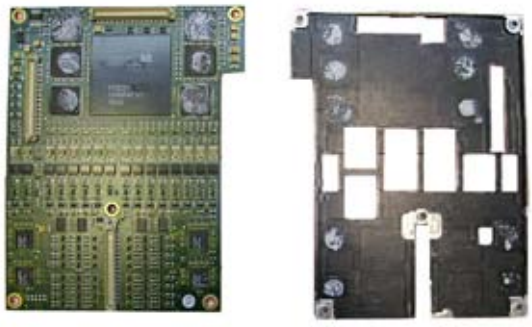


Figure 8-176 Separating the Two TR32 Boards from Each Other

14.) Separate each of the two TR32 Boards from their respective Heat Sink pads - see Figure 8-177.



TR32 Board Heat Sink Pad

Figure 8-177 Heat Sink Pad Separated from TR32 Board

NOTE: Proceed to replace the defective board, as described in the appropriate steps of the following procedure.

8-6-10-5 TR32 and RFI Boards Installation Procedure

NOTE: This procedure applies to replacement of one or more of the defective boards (TR32A and/or TR32B and/or RFI).

CAUTION

When performing these procedures, take precautions to avoid damage of electrostatic-sensitive components. Always have the ESD wrist strap connected either to the DIB chassis or to the GND plug at the rear of the scanner, and to your hand.

8-6-10 TR32 and RFI Boards Replacement Procedure (cont'd)

1) Prepare each of the two TR32 Boards, as follows:

   a.) Apply a small quantity of heat sink paste (*Dow Corning® 340 Heat Sink Compound*, or similar) to each of the ten areas shown in Figure 8-178 (marked with arrows).

   b.) Refit the heat sink pad to the RR32 board - refer to Figure 8-177 on page 8-141.

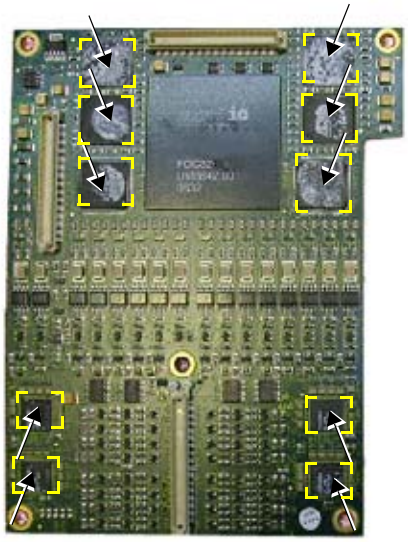


Figure 8-178 TR32 Board Showing Areas for Application of Heat Sink Paste

2) Re-connect the two TR32 Boards to each other (gently press together as shown in Figure 8-176 on page 8-141).

3) Connect the TR32 Boards to the RFI Board (gently press together as shown in Figure 8-175 on page 8-140).

4) Return the TR32 and RFI Board assembly - together with the Heat Sink pad - to the appropriate position in the cage assembly. Refer to Figure 8-174 on page 8-140.

NOTE: When performing this step, carefully slide the Heat Sink into position.

5) Reconnect the BEP-to-RFI flex cable to the cable connector on RFI Board, as shown in Figure 8-172 on page 8-139.

6) Reconnect the power cable to the RFI Board - see Figure 8-172.

7) Return and fasten the 10 screws (previously removed) to secure the RFI board in position - refer to Figure 8-171.

8) Return the metal plate (that covers the RFI power cable) to the side of the cabinet cage assembly and fasten securely with the 2 screws (previously removed) - refer to Figure 8-170 on page 8-138.

9.) Return the PIB Board, as described in the 8-6-9-5 "PIB Board Installation Procedure" on page 8-136.

10) Fold the cabinet cage assembly in the closed position and secure by fastening each of the two thumbscrews.

11) Return the cabinet cage assembly to the system, reconnect the cables (previously disconnected), close the cabinet cage door and fasten securely with the two latches.
Refer to the 8-6-1-4 "Cabinet Cage Assembly Closing and Installation Procedure" on page 8-104.

8-6-10 TR32 and RFI Boards Replacement Procedure (cont'd)

12) Return the system front cover, as described in the 8-2-6-4 "Front Cover Installation Procedure" on page 8-18.

13) Return the system left and right side covers, as described in the 8-2-3-4 "Left Side Cover Installation Procedure" on page 8-7 and 8-2-2-4 "Right Side Cover Installation Procedure" on page 8-5.

14.) Turn ON power to the ultrasound scanner.

15.) Proceed to perform the following functionality tests:

- 10-6-4 "Grounding Continuity" on page 10-23
- *10-6-5 - Chassis Current Leakage Test*
- 7-2-4-2-1 "Calibration" on page 7-10
- 7-2-4-1 "Full System Test" on page 7-9
- 4-3-1-8 "Front End Tests" on page 4-23
- 4-3-1-9 "Visual Test" on page 4-31

8-6-11 Fans and Fan Board Replacement Procedure

CAUTION

When performing these procedures, take precautions to avoid damage of electrostatic-sensitive components. Always have the ESD wrist strap connected either to the DIB chassis or to the GND plug at the rear of the scanner, and to your hand.

If a battery is present, first remove the battery as it contains stored energy. Refer to 8-6-2-4 "Battery Removal Procedure" on page 8-106.

8-6-11-1 Tools

Use the appropriate flat and Phillips-type screwdrivers, as indicated in the fan replacement procedure.

8-6-11-2 Time Required

15 minutes

8-6-11-3 Preparation

Shut down the Vivid S5 N or Vivid S6 N ultrasound unit, as described in *Chapter 3* - System Setup.

8-6-11-4 Fan and Fan Board Removal Procedure

1) Remove the system left and right side covers, as described in the 8-2-3-3 "Left Side Cover Removal Procedure" on page 8-6 and 8-2-2-3 "Right Side Cover Removal Procedure" on page 8-5.
2) Remove the system front cover, as described in the 8-2-6-3 "Front Cover Removal Procedure" on page 8-16.
3) Open and remove the cabinet cage assembly and place it on a stable surface, as described in 8-6-1 "Opening and Removing the Cabinet Cage Assembly" on page 8-98.

NOTE: Each fan is secured on the cage assembly with four Phillips screws (one at each corner) as shown in Figure 8-179 below.

4) Loosen and remove the four Phillips screws that secure the defective Fan to the cage assembly (see Figure 8-179).

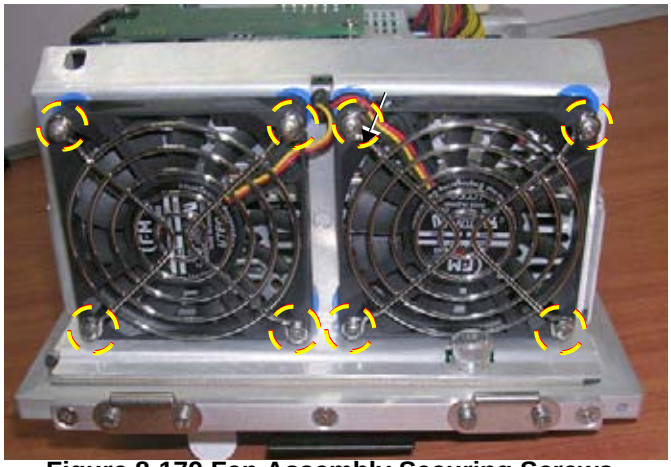


Figure 8-179 Fan Assembly Securing Screws

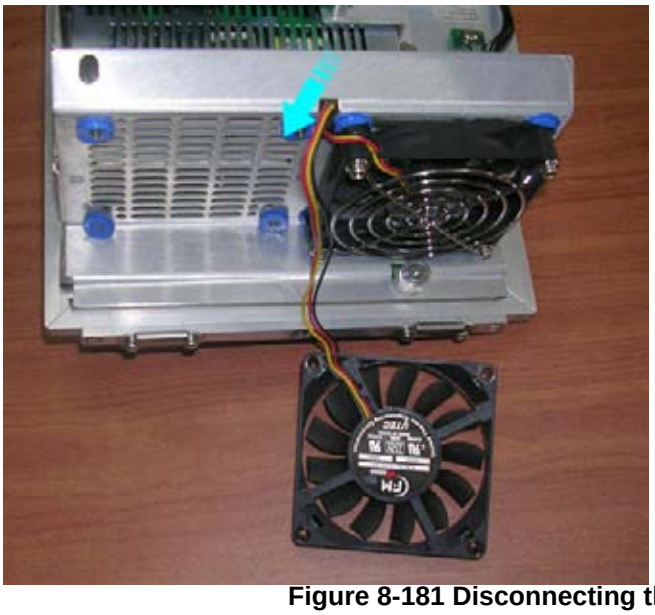
8-6-11 Fans and Fan Board Replacement Procedure (cont'd)

5) Carefully remove the fan by pulling it towards you. Leave each of the blue-colored shock absorbers in position on the mounting pin at each of the four corners (see Figure 8-180 on page 8-145).

Figure 8-180 Location of Shock Absorbers on Mounting Pins

6) Disconnect the fan cable from the connector on the Fan Control Board.

7.) Route the fan cable (with connector attached) *forwards* through the rectangular-shaped hole, then remove the fan and cable from the system, as shown in Figure 8-181 below.



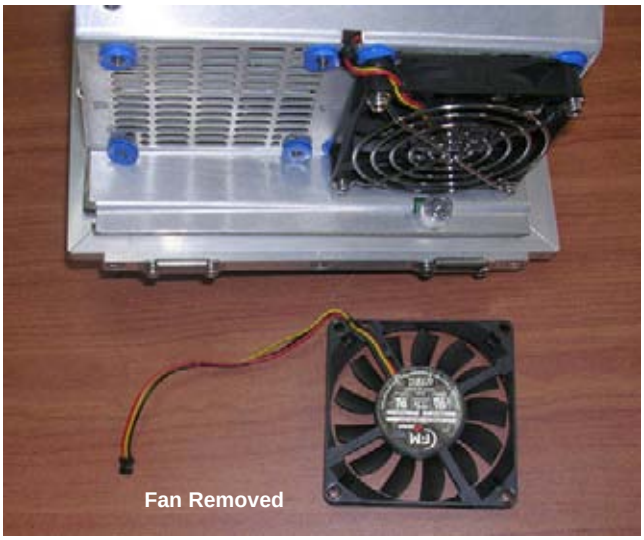


Figure 8-181 Disconnecting the Fan Cable and Removing the Fan

8-6-11 Fans and Fan Board Replacement Procedure (cont'd)

8-6-11-5 Fan and Fan Board Installation Procedure

1) Place the replacement Fan (with cable attached) close to the cage assembly, then route the fan cable (with connector attached) *backwards* through the rectangular-shaped hole - refer to Figure 8-181 on page 8-145.
2) Re-connect the fan cable to the connector on the Fan Control Board.
3) Using both hands, carefully mount the replacement Fan into position on the cage assembly, taking care to align each of the holes with the four mounting pins. Make sure the four shock absorbers are properly seated - refer to Figure 8-180 on page 8-145.
4.) Return and fasten the four Phillips screws (previously removed) to secure the Fan Board in position on the cage assembly, as shown in Figure 8-179 on page 8-144.
5) Return the cabinet cage assembly to the system, reconnect the cables (previously disconnected), close the cabinet cage door and fasten securely with the two latches.
Refer to the 8-6-1-4 "Cabinet Cage Assembly Closing and Installation Procedure" on page 8-104.
6) Return the front cover, as described in the 8-2-6-4 "Front Cover Installation Procedure" on page 8-18.
7) Return the left and right side covers, as described in the 8-2-3-4 "Left Side Cover Installation Procedure" on page 8-7 and 8-2-2-4 "Right Side Cover Installation Procedure" on page 8-5.
8.) Turn ON power to the system.
9.) Proceed to perform the following functionality tests:
   - 10-6-4 "Grounding Continuity" on page 10-23
   - 10-6-5 "Chassis Current Leakage Test" on page 10-24
   - 7-2-4-3-3 "Temperatures Test" on page 7-13
   - 7-2-4-3-4 "Fans Speed Test" on page 7-13
   - 7-2-4-3-5 "Fans Speed Setting Test" on page 7-13.

8-6-12 Peripherals AC Outlet Connectors Panel Replacement Procedure

8-6-12-1 Tools

Use the appropriate flat and Phillips-type screwdrivers as indicated in the Peripherals AC Outlet Connectors Panel replacement procedure.

8-6-12-2 Preparation

Shut down the Vivid S5 N or Vivid S6 N ultrasound unit, as described in *Chapter 3* - System Setup.

8-6-12-3 Peripherals AC Outlet Connectors Panel Removal Procedure

1) Disconnect any peripherals currently connected to the system.
2) Remove the system left and right side covers, as described in the "Left Side Cover Removal Procedure" on page 8-6 and "Right Side Cover Removal Procedure" on page 8-5.
3) Remove the system front cover, as described in the "Front Cover Removal Procedure" on page 8-16.
4) Loosen and remove the two screws securing the Peripherals AC Outlet Connectors Panel onto the top of the AC Distribution box, as shown in Figure 8-182.

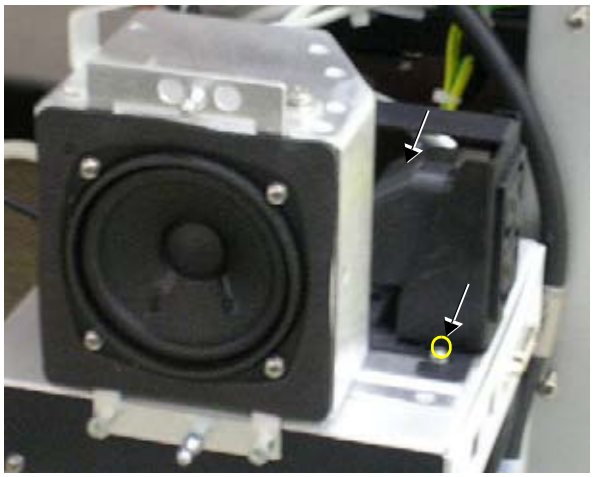


Figure 8-182 Peripherals AC Outlet Connectors Panel Securing Screws

8-6-12 Peripherals AC Outlet Connectors Panel Replacement Procedure (cont'd)

5.) Slide the connectors bracket out to remove it from the system - see Figure 8-183.

Figure 8-183 Removing the Peripherals AC Outlet Connectors Panel

8-6-12-4 Peripherals AC Outlet Connectors Panel Installation Procedure

1.) Slide the new Peripherals AC Outlet Connectors into position on the system, carefully aligning the bracket on top of the AC Distribution box - refer to Figure 8-183 on page 8-148.

2) Return and fasten the two screws (previously removed) to secure the Peripherals AC Outlet Connectors Panel onto the top of the AC Distribution box - refer to Figure 8-182 on page 8-147.

3.) Reconnect any peripherals previously connected to the system.

4) Return the front cover, as described in the 8-2-6-4 "Front Cover Installation Procedure" on page 8-18.

5) Return the left and right side covers, as described in the "Left Side Cover Installation Procedure" on page 8-7 and 8-2-2-4 "Right Side Cover Installation Procedure" on page 8-5.

6.) Turn ON power to the system.

7.) Proceed to perform the following functionality tests:

- 10-6-4 "Grounding Continuity" on page 10-23
- 10-6-5 "Chassis Current Leakage Test" on page 10-24

8-6-13 Sub-woofer Assembly Replacement Procedure

8-6-13-1 Tools

Use the appropriate flat and Phillips-type screwdrivers and a wire cutter as indicated in the Sub-woofer replacement procedure.

8-6-13-2 Preparation

Shut down the Vivid S5 N or Vivid S6 N ultrasound unit, as described in *Chapter 3* - System Setup.

8-6-13-3 Sub-woofer Removal Procedure

1) Remove the system left and right side covers, as described in the "Left Side Cover Removal Procedure" on page 8-6 and "Right Side Cover Removal Procedure" on page 8-5.
2) Remove the system front cover, as described in the "Front Cover Removal Procedure" on page 8-16.
3) Disconnect the D-Type power cable from the DIB (see Figure 8-184).
4) Disconnect the Sub-woofer cable from the cable connection on the AC Distribution box - refer to Figure 8-184.

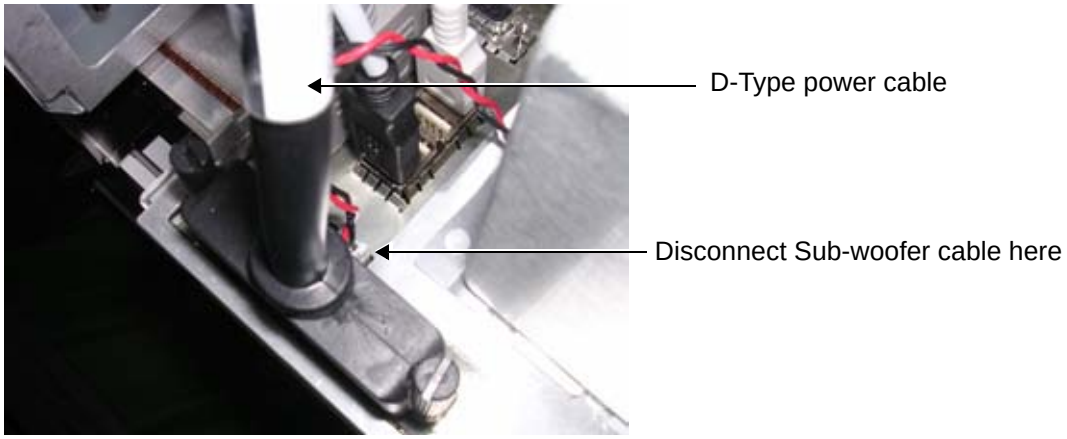


Figure 8-184 Sub-woofer Cable Connection

8-6-13 Sub-woofer Assembly Replacement Procedure (cont'd)

5.) Loosen the two screws securing the Sub-woofer to the top of the AC Distribution box.

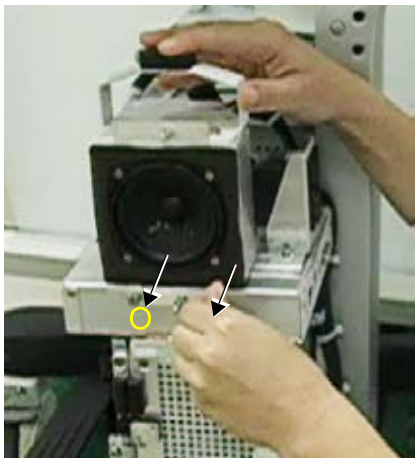


Figure 8-185 Loosening the Securing Screws

6.) Remove the Sub-woofer from the top of the AC Distribution box (together with the cable attached) - see Figure 8-186.

Figure 8-186 Removing the Sub-woofer

8-6-13-4 Sub-woofer Installation Procedure

1.) Return the replacement Sub-woofer (together with the cable attached) to the correct position on top of the AC Distribution box - refer to Figure 8-186.

2.) Secure in position by tightening the two screws (previously loosened) - refer to Figure 8-185 on page 8-150.

3.) Connect the Sub-woofer cable to the cable connection on the AC Distribution box - refer to Figure 8-184 on page 8-149.

8-6-13 Sub-woofer Assembly Replacement Procedure (cont'd)

4.) Reconnect the D-Type power cable to the DIB (refer to Figure 8-184 on page 8-149).

5) Return the front cover, as described in the "Front Cover Installation Procedure" on page 8-18.

6) Return the left and right side covers, as described in the "Left Side Cover Installation Procedure" on page 8-7 and "Right Side Cover Installation Procedure" on page 8-5.

7.) Turn ON power to the system.

8.) Proceed to perform the following functionality tests:

- 10-6-4 "Grounding Continuity" on page 10-23
- 10-6-5 "Chassis Current Leakage Test" on page 10-24
- 4-3-1-4 "Speakers Tests" on page 4-20

8-6-14 DIB (Distribution Interface Board) Replacement Procedure

CAUTION

When performing these procedures, take precautions to avoid damage of electrostatic-sensitive components. Always have the ESD wrist strap connected either to the DIB chassis or to the GND plug at the rear of the scanner, and to your hand.

If a battery is present, first remove the battery as it contains stored energy. Refer to 8-6-2-4 "Battery Removal Procedure" on page 8-106.

8-6-14-1 Tools

Use the appropriate flat and Phillips-type screwdrivers and a wire cutter as indicated in the DIB replacement procedure.

8-6-14-2 Preparation

Shut down the Vivid S5 N or Vivid S6 N ultrasound unit, as described in *Chapter 3* - System Setup.

8-6-14-3 DIB Removal Procedure

1) Remove the system left and right side covers, as described in the 8-2-3-3 "Left Side Cover Removal Procedure" on page 8-6 and 8-2-2-3 "Right Side Cover Removal Procedure" on page 8-5.
2) Remove the system front cover, as described in the 8-2-6-3 "Front Cover Removal Procedure" on page 8-16.
3.) Disconnect any peripherals currently connected to the system.
4.) Remove the Peripherals AC Outlet Connectors Panel, as described in 8-6-12-3 "Peripherals AC Outlet Connectors Panel Removal Procedure" on page 8-147.
5) Remove the sub-woofer, as described in the 8-6-13-3 "Sub-woofer Removal Procedure" on page 8-149.
6) Unplug each of the six internal cables from the DIB Box, as shown in Figure 8-187 below.

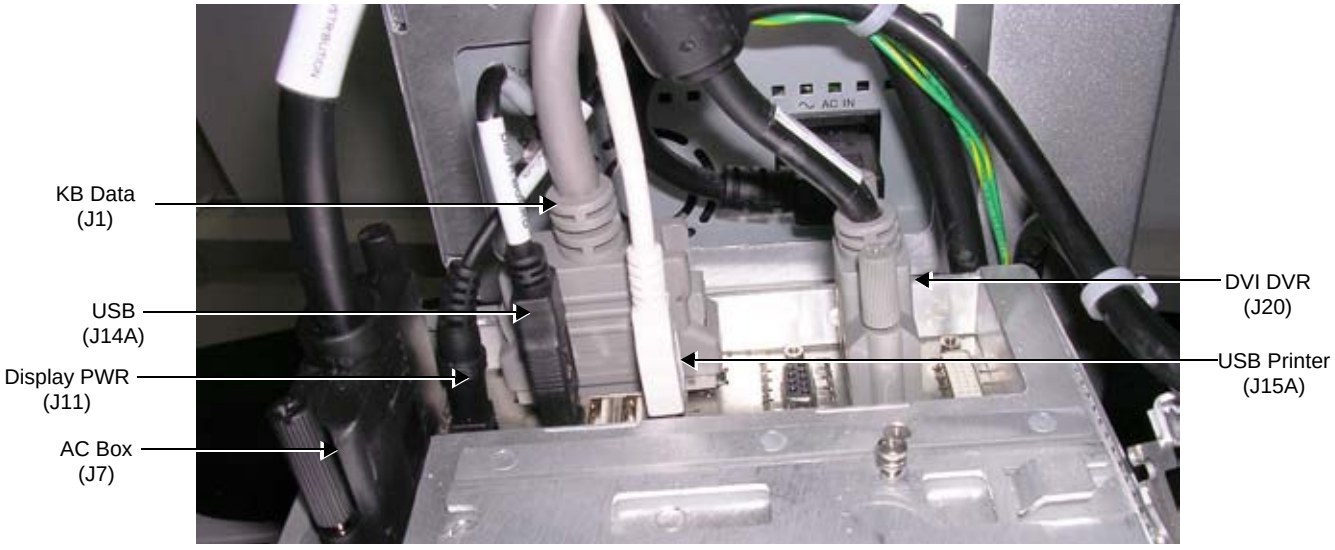


Figure 8-187 Cables Connected to DIB Box

8-6-14 DIB (Distribution Interface Board) Replacement Procedure (cont'd)

NOTE: Refer also to the schematic diagram in Figure 8-188.

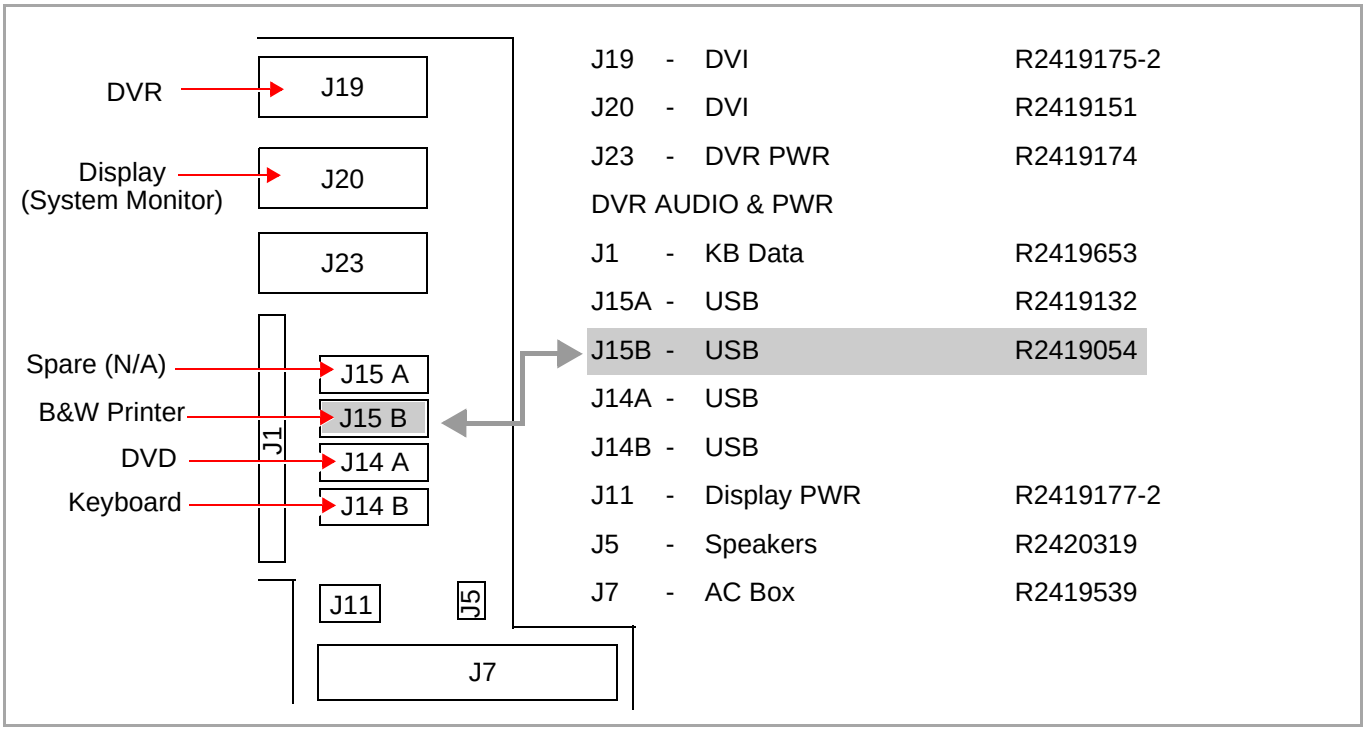


Figure 8-188 Schematic Diagram of Internal Cables and Connectors

7) Loosen the three screws that secure the DIB Box on the cage assembly, as shown in Figure 8-189 below.

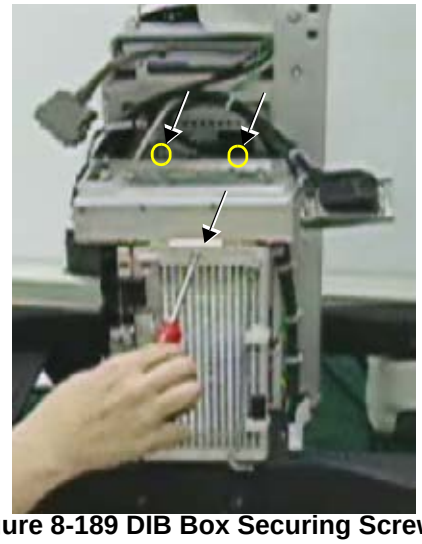


Figure 8-189 DIB Box Securing Screws

8-6-14 DIB (Distribution Interface Board) Replacement Procedure (cont'd)

8) While carefully lifting the DIB Box *upwards*, disconnect the LAN cable connection from underneath then remove the DIB Box from the system - see Figure 8-190 below.

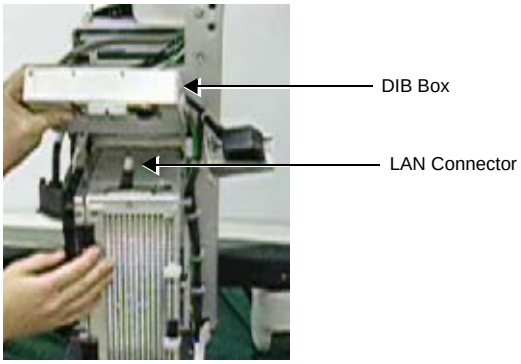


Figure 8-190 Removing the DIB Box

9.) Remove the DIB from the system.

8-6-14-4 DIB Installation Procedure

1.) Return a new DIB Box to the system, placing it in the approximate position on the cage assembly.

2) While carefully lifting the DIB Box *upwards*, reconnect the LAN cable connection from underneath - see Figure 8-190, above.

3) Fasten the three screws to secure the DIB Box on the cage assembly, as shown in Figure 8-189.

4) Reconnect each of the six internal cables to the DIB Box - refer to Figure 8-187 on page 8-152 and Figure 8-188 on page 8-153.

5) Return the sub-woofer, as described in the "Sub-woofer Installation Procedure" on page 8-150.

6.) Return the Peripherals AC Outlet Connectors Panel, as described in "Peripherals AC Outlet Connectors Panel Installation Procedure" on page 8-148.

7.) Reconnect any peripherals previously connected to the system.

8) Return the front cover, as described in the "Front Cover Installation Procedure" on page 8-18.

9) Return the left and right side covers, as described in the "Left Side Cover Installation Procedure" on page 8-7 and "Right Side Cover Installation Procedure" on page 8-5.

10.) Turn ON power to the system.

11.) Proceed to perform the following functionality tests:

- 10-6-4 "Grounding Continuity" on page 10-23
- 10-6-5 "Chassis Current Leakage Test" on page 10-24
- 4-3-1-4 "Speakers Tests" on page 4-20
- 4-3-1-1 "Alphanumeric Keyboard Test" on page 4-17
- 4-3-1-2 "Extended Keyboard and Trackball Test" on page 4-17
- 4-3-1-5 "Light Detector Test for Vivid S6 N only" on page 4-21
- 4-3-4-1 "USB Test" on page 4-35
- 4-3-1-6 "Monitor Test" on page 4-21

8-6-15 AC Distribution Box Replacement Procedure

8-6-15-1 Tools

Use the appropriate flat and Phillips-type screwdrivers as indicated in the AC Distribution Box replacement procedure.

8-6-15-2 Preparation

Shut down the Vivid S5 N or Vivid S6 N ultrasound unit, as described in *Chapter 3 -* .

8-6-15-3 AC Distribution Box Removal Procedure

1.) Remove the bottom rear cover from the system, as described in "Bottom Rear Cover Removal Procedure" on page 8-21.

As shown in Figure 8-191 below, pull the protective cover outwards and downwards to reveal the AC Input Box assembly - refer to Figure 8-192.

Figure 8-191 Bottom Rear Cover - View from Side

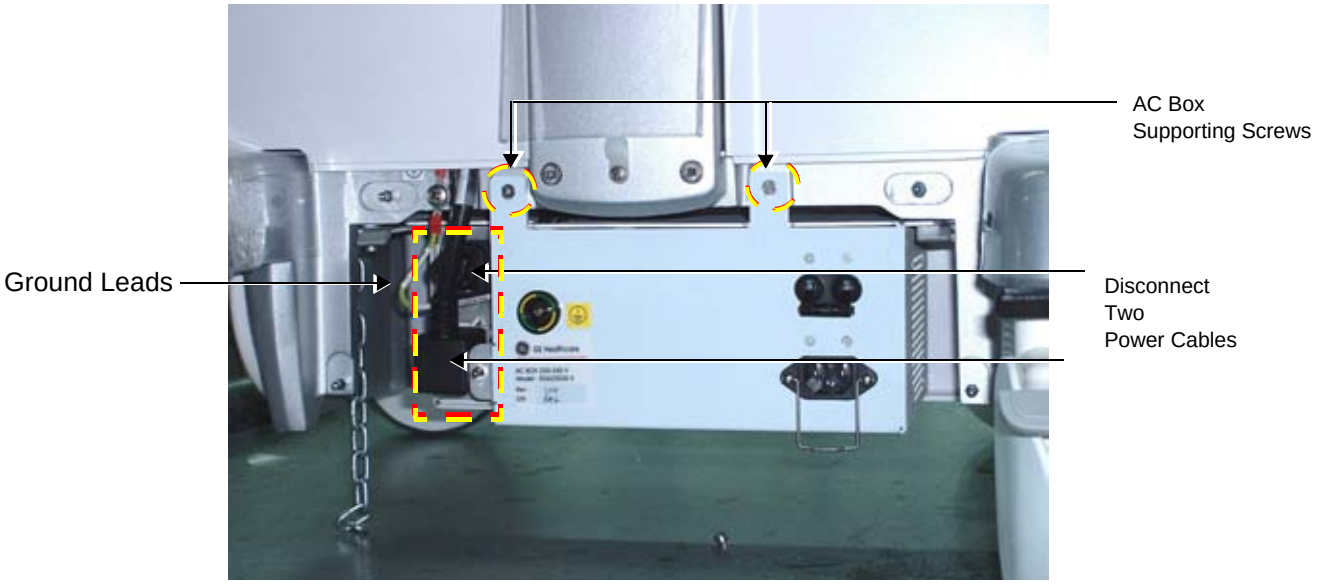


Figure 8-192 AC Box Secured with Two Supporting Screws

2.) Disconnect the two power cables (seen in Figure 8-192) from the AC Box by squeezing the plastic retainer clips inwards (Figure 8-193).

Figure 8-193 Plastic Securing Clips on Power Cables

3.) Disconnect both ground leads.

4.) To remove the AC box, unscrew the two supporting screws (shown in Figure 8-192) and slide the AC box all the way out until is completely removed from the system.

8-6-15-4 AC Distribution Box Installation Procedure

NOTE: The AC Box Assembly is supplied with two jumpers to alter the input power supply (220 - 240 V and 110 -120 V, as applicable).

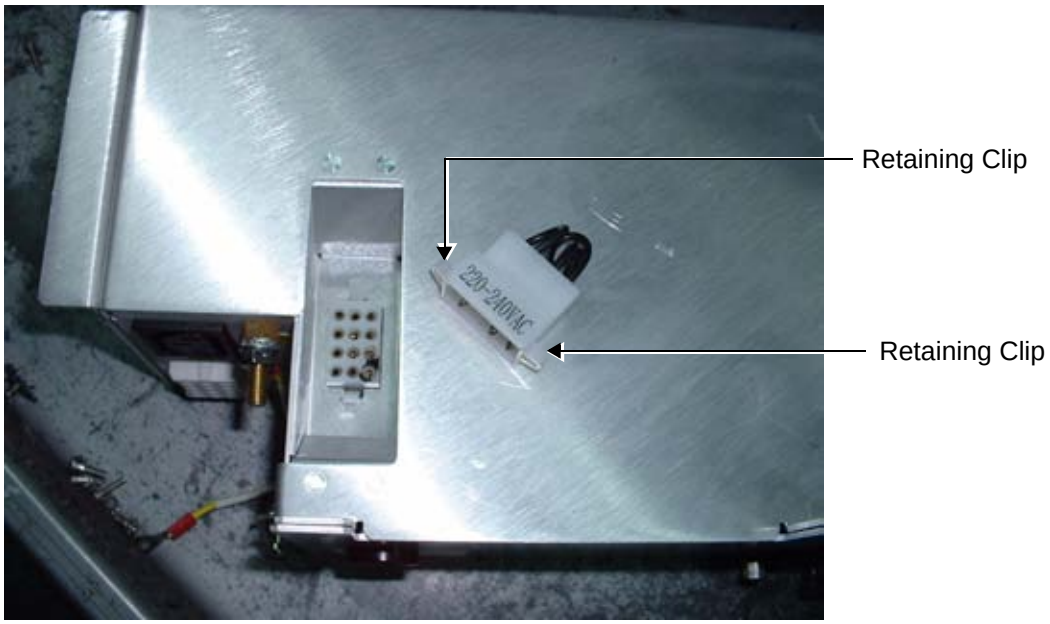


Figure 8-194 AC Box Showing Jumper with Two Retaining Clips

1.) To remove the jumper, squeeze the two plastic retaining clips (Figure 8-194) together and pull the jumper away from its base.
Return the appropriate jumper to its socket according to the required voltage.

Note: For 220 V systems, the jumper can only be inserted in one position.

2.) Place the AC Box in position at the rear of the SafeLock Cart by sliding it onto the support rails and pushing it all the way to the end.

3.) Return the two supporting screws (previously removed) to their positions and fasten them securely (refer to Figure 8-192).

4.) Reconnect the power cables.

5.) Reconnect the earth leads - refer to note below.

Note: When reconnecting the ground leads, there are two spring washers that should be installed in the order shown in Figure 8-195. In addition, place the ground lead connector with the flat surface facing *towards* the Cart to prevent damage to the cable holder and the cable.

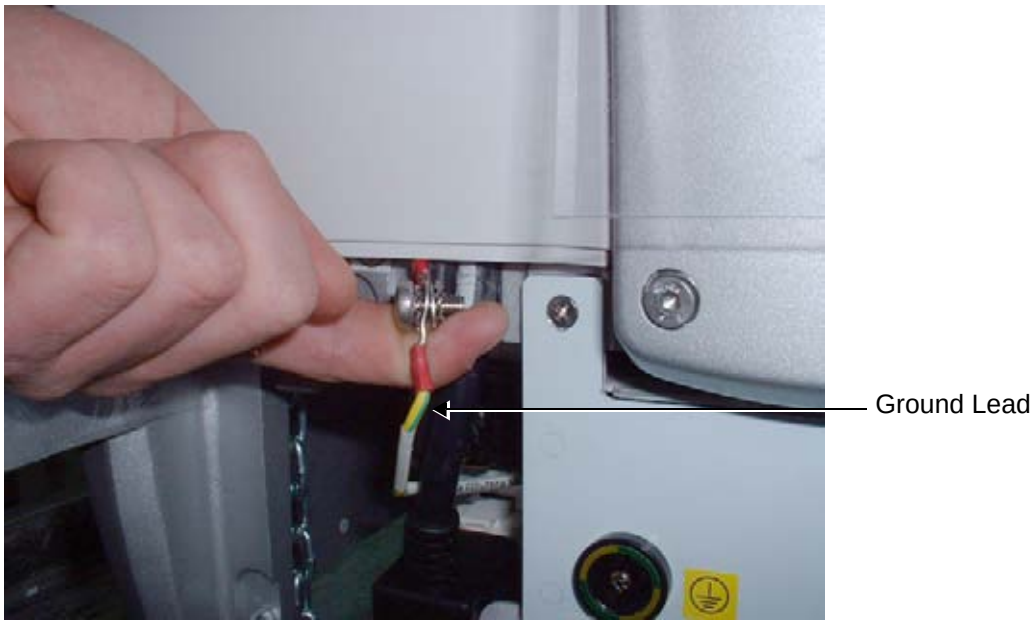


Figure 8-195 Ground Lead Showing Spring Washers and Cable Holder

6.) Return the bottom rear cover to the SafeLock Cart, as described in "Bottom Rear Cover Installation Procedure" on page 8-21.

7.) Turn ON power to the system.

8.) Proceed to perform the following functionality tests:

- "Grounding Continuity" on page 10-23
- "Chassis Current Leakage Test" on page 10-24
- "Calibration" on page 7-10
- "Full System Test" on page 7-9

Section 8-7
Mechanical Components Replacement Procedures

8-7-1 Foot Rest Replacement Procedure

8-7-1-1 Tools

None

8-7-1-2 Preparations

None

8-7-1-3 Foot Rest Removal Procedure

NOTE: The Foot Rest is secured in position on the front of the system, between the wheelbase:

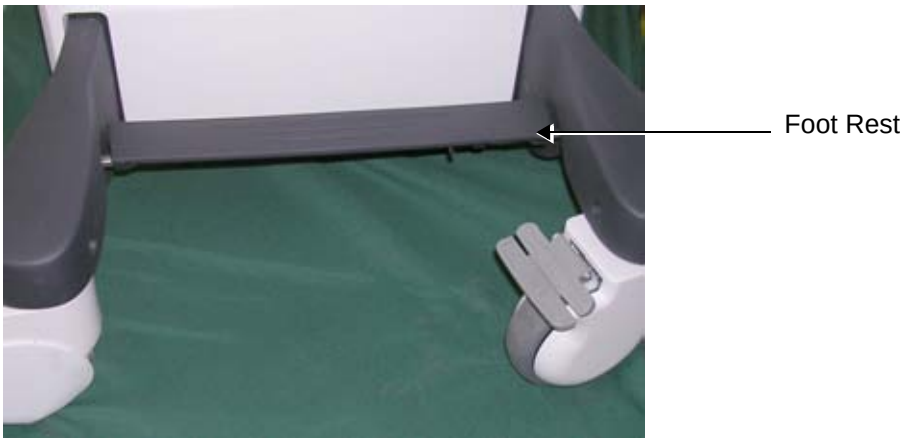


Figure 8-196 Foot Rest in Position on the System

1) Working from the front of the system, slide the spring-loaded bolt hinge (located underneath the foot rest on the right side) towards the *left* and release the right side of the foot rest from the wheelbase, as indicated in Figure 8-197.

8-7-1 Foot Rest Replacement Procedure (cont'd)

Figure 8-197 Bolt Hinge Securing Foot Rest to Wheelbase

2.) Release the other side of the foot rest from the securing pin on the *left* side - see Figure 8-197.

3.) Remove the Foot Rest.

8-7-1-4 Foot Rest Installation Procedure

1) Position a new Foot Rest at the front of the system, between the wheelbase.

2) Fit the *left* side of the Foot Rest into the securing pin on the *left* side of the chassis - refer to Figure 8-197.

3.) Insert the *right* side of the footrest into the *right* side of the wheelbase; close the spring-loaded bolt hinge (located underneath the foot rest on the right side) to fasten the footrest securely in position on the wheelbase - refer to Figure 8-197 on page 8-160.

4.) Proceed to perform the following functionality tests:

- 4-3-3-4 "Front Wheel Function Test" on page 4-34
- 4-3-3-5 "Rear Wheel Function Test" on page 4-34

8-7-2 Brake and Swivel Locking Wheels Replacement Procedure

NOTE: The procedure below is the same whether replacing a Brake Locking Wheel (Front Wheel: P/N S2420671) or a Swivel Locking Wheel (Rear Wheel: P/N S2420672).

8-7-2-1 Tools

Use the appropriate flat screwdriver and Allen key, as indicated in the Brake and Swivel Locking Wheels replacement procedure.

8-7-2-2 Preparations

Make sure the system is standing securely on a level surface, with the wheels in the locked position.

8-7-2-3 Brake and Swivel Locking Wheels Removal Procedure

1) Using a flat screwdriver, carefully remove the plastic screw cap covering the securing screw on the the inner side of the wheel housing, as shown in Figure 8-198.

Figure 8-198 Removing the Screw Cap

2) Using an Allen key, loosen and remove the screw that secures the wheel shaft in the wheel securing socket

Figure 8-199 Removing the Securing Screw

3) Lift the chassis sufficiently to allow the wheel to drop down out of the wheel securing socket.

4.) Remove the wheel.

8-7-2-4 Brake and Swivel Locking Wheels Installation Procedure

1) Carefully lift the chassis sufficiently to allow insertion of the replacement wheel shaft into the wheel securing socket.

2) Push the wheel shaft all the way up into the socket, then gently lower the chassis to the ground.

3.) Return and fasten the Allen screw (previously removed - see Figure 8-199), making sure the screw is tightened sufficiently to secure the wheel on the chassis. ***Do not over-tighten the screw!***

4) Return the screw cap (previously removed) by snapping it back into position (refer to Figure 8-198).

5.) Check that the wheel for free movement and proper operation of the brake by performing the following functional checks, as appropriate:

- *Front Wheel Function Test* - see Table 4-19 on page 34
- *Rear Wheel Function Test* - see Table 4-20 on page 34

8-7-3 Lower Arm Replacement Procedure

8-7-3-1 Tools

Use the appropriate flat and Phillips-type screwdrivers as indicated in the Lower Arm replacement procedure.

8-7-3-2 Preparations

Shut down the Vivid S5 N or Vivid S6 N ultrasound unit, as described in *Chapter 3* - System Setup.

8-7-3-3 Lower Arm Removal Procedure

1) Working from the front of the system, raise the console to the *maximum up* position.
2) Make sure that the console is *aligned* in the central position (not pulled to one side or the other).
3.) Loosen and remove the screw that is located at the base of the operator panel (below the keyboard), as shown in Figure 8-200 below.

Figure 8-200 Removing Screw on Left Side of Lower Arm

8-7-3 Lower Arm Replacement Procedure (cont'd)

4.) While moving the keyboard slightly up and down with one hand, use the screwdriver to push the securing pin all the way out of the base of the operator panel, as shown in Figure 8-201 below.,

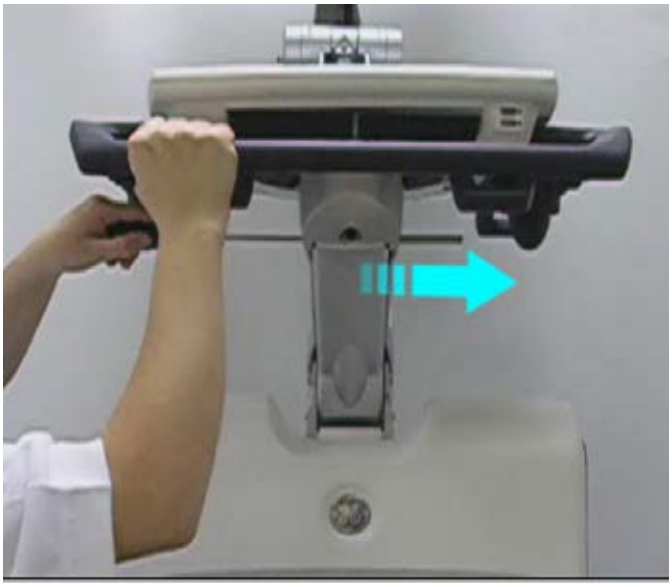


Figure 8-201 Removing Securing Pin from Base of Operator Panel

5) Using one hand to tilt the console *backwards*, use the other hand to support the lower arm as it tilts *downwards*, as shown in Figure 8-202 below.

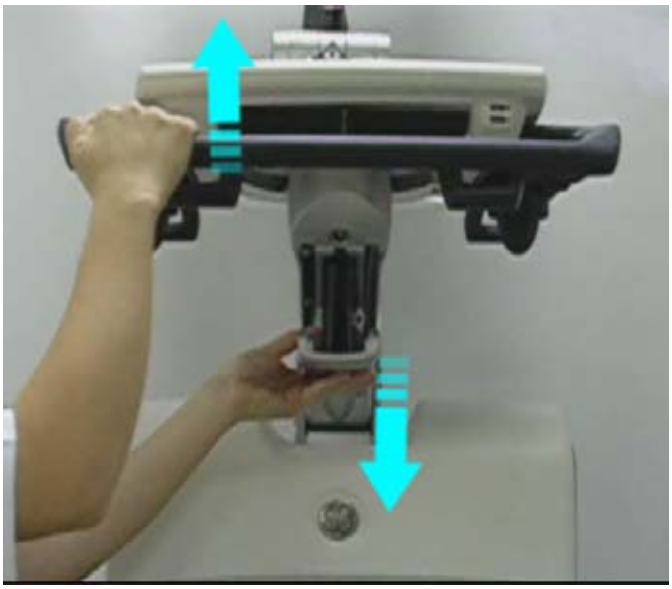


Figure 8-202 Releasing the Lower Arm from the Fixed Position

6) Lower the arm to access the lower securing pins as shown in Figure 8-203 and remove the securing clips on either side of the lower arm.

Figure 8-203 Removing Left Securing Clip from Securing Pin

7) Using a screwdriver, tap out the first securing pin and support the lower arm with the screwdriver in place of the pin.

8.) Remove the second securing pin and similarly support the other side of the lower arm with a screwdriver.

9.) While supporting the Lower Arm with one hand, use a Phillips screwdriver to disconnect the ground lead - Figure 8-204.

Figure 8-204 Removing Securing Pin and Disconnecting Ground Lead

10) Remove the Lower Arm from the system, as shown in Figure 8-205.

Figure 8-205 Removing the Lower Arm

8-7-3 Lower Arm Replacement Procedure (cont'd)

8-7-3-4 Lower Arm Installation Procedure

1) Working from the front of the system, return a new Lower Arm to the appropriate position as shown in Figure 8-181 on page 8-145.

2.) While supporting the Lower Arm with one hand, connect the Ground lead.

3) Return and fasten the Lower Arm securing pin (previously removed) on the *right* side of the lower arm - Figure 8-204 on page 8-165.

4) Return and fasten the Lower Arm securing pin (previously removed) on the *left* side of the Lower Arm - Figure 8-204 on page 8-165.

5) Lower the console and raise the Lower Arm to insert the upper support pin previously removed - Figure 8-206.

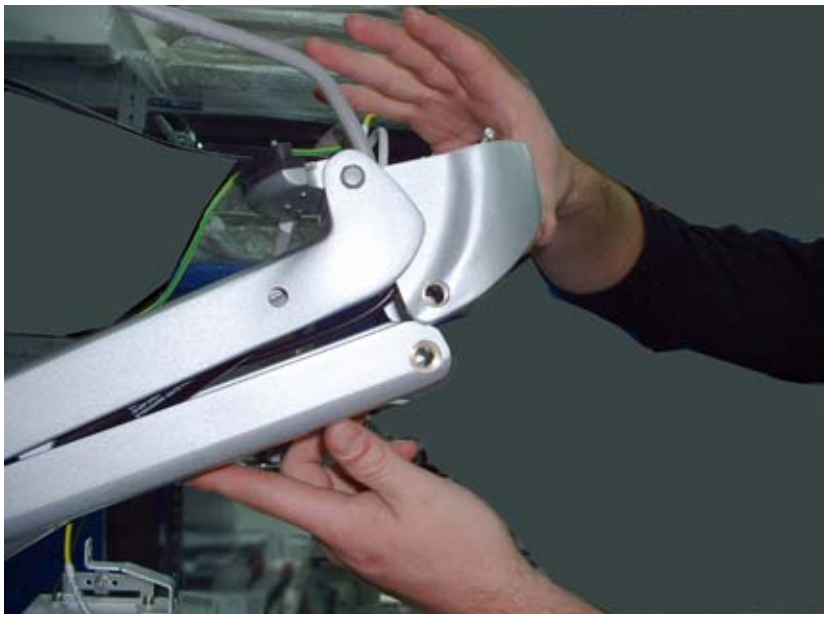


Figure 8-206 Raising Lower Arm to Reconnect with Upper Arm (Console not shown)

6.) While moving the console slightly up and down with one hand, insert the securing pin (previously removed) - refer to Figure 8-201 on page 8-164.

7.) Return and fasten the screw (previously removed from the base of the operator panel - below the keyboard, as shown in Figure 8-200 on page 8-163).

8) Make sure that the console is *aligned* in the central position (not pulled to one side or the other).

9) Lower the console to the *maximum down* position.

10.) Turn ON power to the system.

11.) Proceed to perform the following functionality tests:

- "Arm Movement Test" on page 4-33
- "Grounding Continuity" on page 10-23
- "Chassis Current Leakage Test" on page 10-24

8-7-4 Gas Spring Replacement Procedure

8-7-4-1 Tools

Use the appropriate flat and Phillips type screwdrivers and the appropriate Allen keys.

8-7-4-2 Preparation

Shut down the Vivid S5 N or Vivid S6 N ultrasound unit, as described in *Chapter 3 -* .

8-7-4-3 Gas Spring Removal Procedure

1) Remove the monitor, as described in the “Monitor Removal Procedure” on page 8-24.
2) Remove Keyboard Assembly as described in the “Keyboard Assembly Removal Procedure” on page 8-37.
3.) Remove Lower Arm as described in the “Lower Arm Removal Procedure” on page 8-163.
4.) If the rear tray is attached to the SafeLock Cart, remove it.
5.) Using a flat screw driver, carefully remove the plastic covering caps from the support arm, as shown in Figure 8-207.

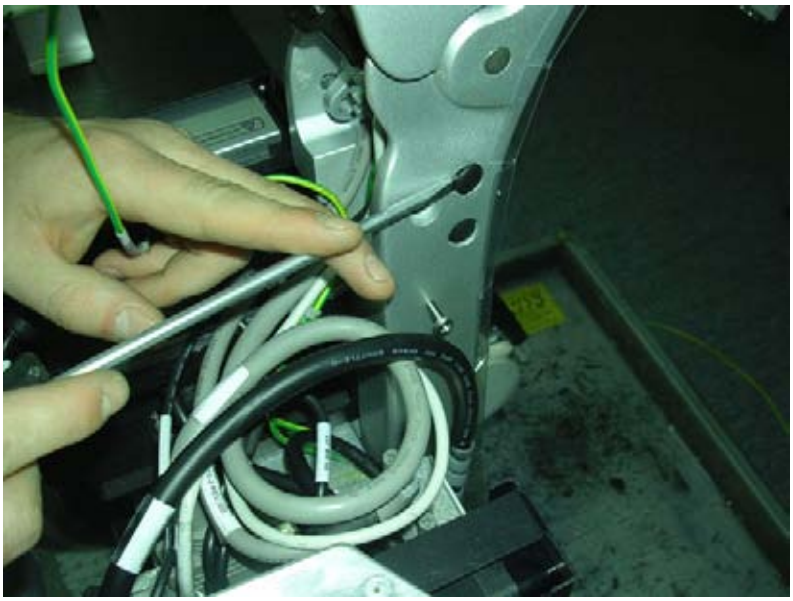


Figure 8-207 Removing Protective Plastic Caps

6.) Using an Allen key, unscrew each locking screw on either side of the support arm - Figure 8-208.

Figure 8-208 Releasing the Securing Screws on Either Side of the Support Arm

7.) Tap out the internal supporting pin using a screwdriver - Figure 8-209.

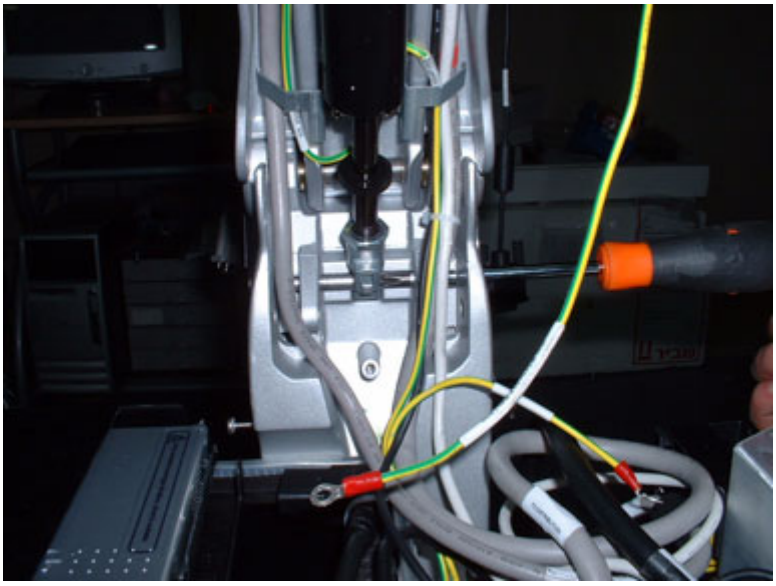


Figure 8-209 Tapping out the Lower Support Pin using a Screwdriver

8.) Similarly, remove the upper gas spring securing pin and use a screwdriver to support the joint - Figure 8-210.

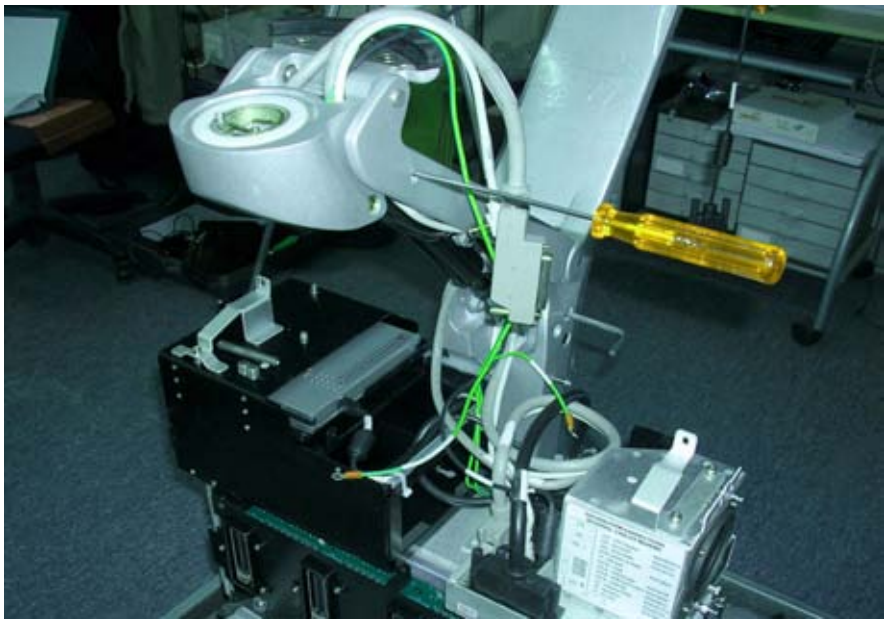


Figure 8-210 Supporting the Upper Gas Spring Bracket with a Screwdriver

9.) Carefully release the upper end of the gas spring, then the lower end of the gas spring to withdraw the gas spring from its location.

10.) Remove the gas spring cable from its holder on the gas spring.

8-7-4-4 Gas Spring Installation Procedure

*NOTE: The gas spring is supplied **without** the top connecting bracket - see Figure 8-211.*

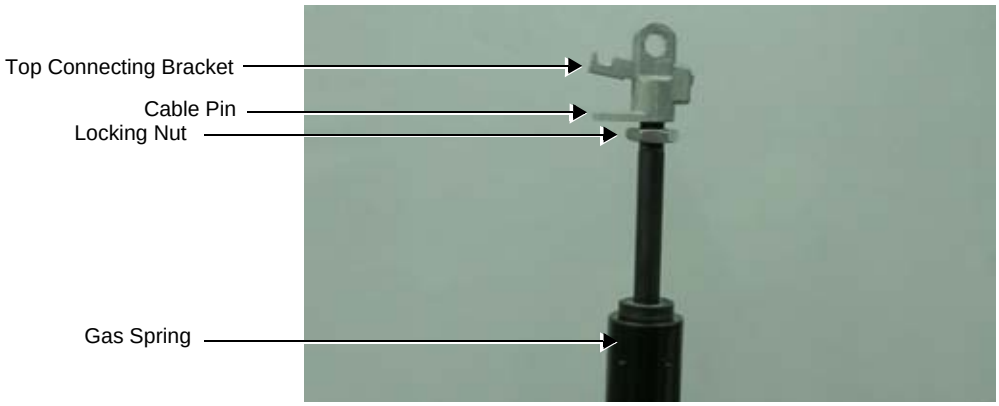


Figure 8-211 Gas Spring with Top Connecting Bracket

1.) Screw the top connecting bracket (previously removed) onto the gas spring turning it a few turns only.
2.) Insert the cable pin into the top connecting bracket and screw the gas spring inwards until it touches the pin.
3.) Tighten the locking nut until it firmly locks against the top connecting bracket.
4.) Return the gas spring, connecting the top part of the gas spring to the Upper Support Arm and insert the connecting pin previously removed.

NOTE: When placing the gas spring cable in the upper arm, be sure to first place the cable uppermost in the Upper Support Arm before returning the gas spring.

5.) Position the gas spring cable in the Upper Support arm and connect the lower part of the gas spring at the base of the upper support arm - Figure 8-212.

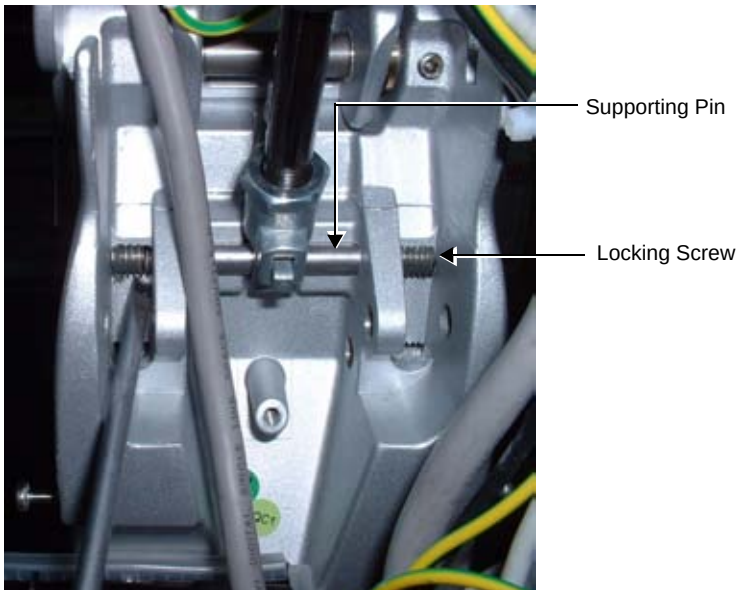


Figure 8-212 Lower Section of Gas Spring showing Connecting Pin and Locking Screws

6.) Insert the supporting pin, threading it through the brackets and the lower gas spring holder, as shown in Figure 8-212.

7.) Applying Locktite, insert the first locking screw previously removed and screw it in until it just touches the supporting pin.

8.) Applying Locktite, return the second screw and tighten firmly - both the screws will now be locked against the supporting pin.

9.) Return the Lower Arm as described in the “Lower Arm Installation Procedure” on page 8-167.

10) Return the Keyboard Assembly as described in the “Keyboard Assembly Installation Procedure” on page 8-40.

11) Return the monitor, as described in the “Monitor Installation Procedure” on page 8-27.

12.) Turn ON power to the system.

13.) Check for proper up/down and side-to-side movement of the operator panel and monitor, as described in “Mechanical Functional Tests” on page 4-33.

14.) Proceed to perform the following functionality tests:

- “Arm Movement Test” on page 4-33
- “Grounding Continuity” on page 10-23
- “Chassis Current Leakage Test” on page 10-24

Section 8-8
Software Loading

8-8-1 Software Installation/Upgrade Procedure Overview

NOTE: If you are upgrading the system software from a previous version, it may be necessary to contact your local OTR department to receive an appropriate software password. Make sure you specify the system serial number located on the Vivid S5 N or Vivid S6 N unit.

For VS5 N & VS6 N systems, if the currently-installed software version is lower than ver. 7.2.2 Build 109, then perform the software upgrade procedure as described in FMI 78061.

NOTE: It is recommended to back-up the archive and the settings as described in the Vivid S5 N or Vivid S6 N User Manual, before commencing software installation (or whenever upgrading the software).

NOTE: Before performing a software upgrade procedure, observe the current trackball speed setting. The same trackball speed setting will be required after completion of the upgrade; this is set using the procedure described in "Trackball Speed Setting" on page 6-8.

WARNING **WARNING: Do not attempt to install software that was not designated for your Vivid S5 N or Vivid S6 N unit. Attempting to install un-approved software will cause irreversible damage to hardware and software!**

Refer to the following sub-sections, as appropriate:

- "Vivid S5 N and Vivid S6 N Software Re-Installation Procedure" on page 8-175
- "Setting the BIOS" on page 8-179
- "BIOS Firmware Update" on page 8-181
- "Formatting and Partitioning the Hard Disk - Automatic Procedure" on page 8-184
- "Formatting and Partitioning the Hard Disk - Manual Procedure" on page 8-186
- "Installing Software only from DVD" on page 8-190
- "Installing Software only or Patch" on page 8-195
- "Installation of PMC Version" on page 8-196

8-8-1-1 Vivid S5 N and Vivid S6 N Software Re-Installation Procedure

Table 8-2 Vivid S5 N and Vivid S6 N Software Re-Installation

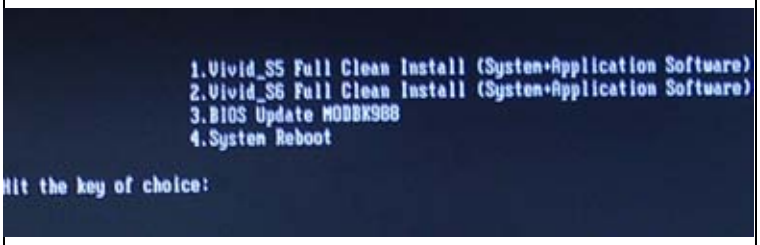
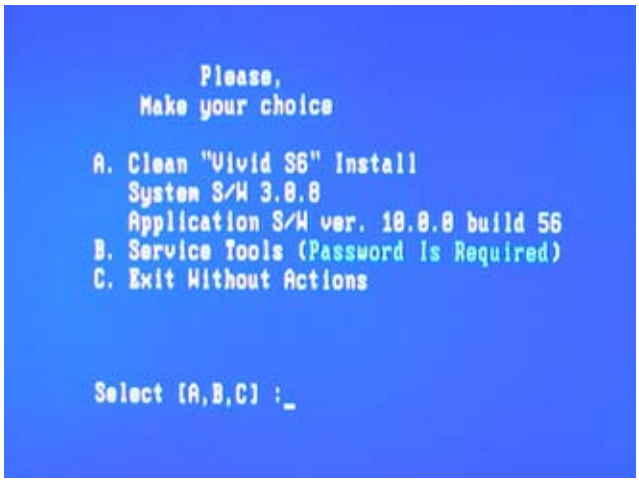
Step	Instruction	Expected Result
1.	Make sure no peripherals are connected to the USB connectors.	
2.	Turn on the system.	
3.	Press the <Eject> button of the DVD\CD-RW drive and remove any media if present.	
4.	Insert the CD provided with the software kit into the DVD\CD-RW.	The DVD\CD-RW drive loads the software CD.
5.	Hold down the <ON/OFF> button for 5 seconds to shutdown the system.	The shutdown options are displayed on-screen.
6.	Select **Full Shutdown**.	The system powers down.
7.	Hold down the <ON/OFF> button for three seconds.	The system powers ON and when system boot-up from the CD is complete, the following message is displayed prompting you to select the required option: 
8.	Select option 1. **Vivid_S6 Full Clean Install (System + Application Software**)	Wait until the following message is displayed, prompting you to select the required option: 
9.	Select option A. **Clean "Vivid S6" Install System S/W ...**	The user is prompted for a password.

Table 8-2 Vivid S5 N and Vivid S6 N Software Re-Installation (cont'd)

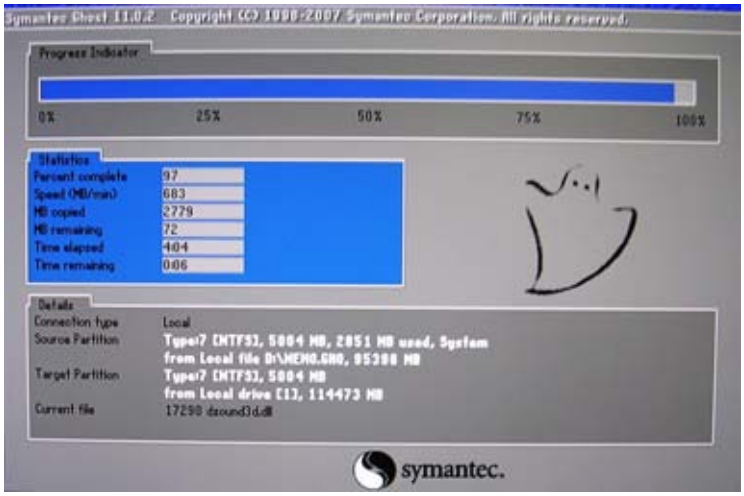
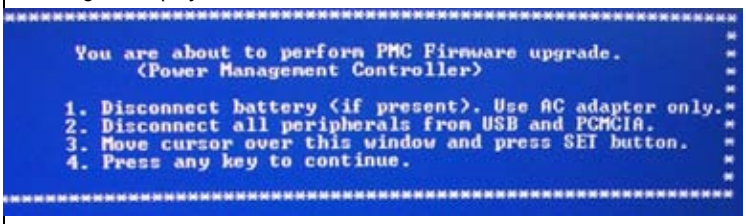
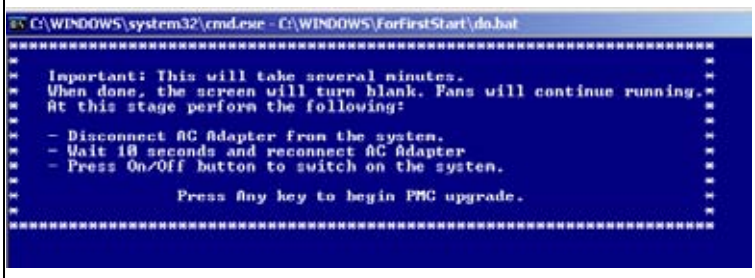
Step	Instruction	Expected Result
10.	When prompted, type the following password: **geulsservice** and press <**Enter**>. Note: when typing the password, use lower-case letters.	A message is displayed showing the current system ID. The CD then begins the software installation process and a progress indicator is displayed, as shown below:  This stage of the process takes approximately 5 mins. A message is then displayed on-screen prompting you to press <Eject> and remove the CD, then to press <CTRL + ALT + DELETE> to reboot the system.
11.	Press <Eject> and remove the CD. Press <CTRL+ALT+DELETE>.	The system re-boots.
12.	Follow the instructions on the screen, clicking OK (or Cancel) when prompted.	The machine performs a number of reboots before completing the installation. As the installation proceeds, the system displays various installation screens. The installation process will take approximately 15 minutes - ***DO NOT ATTEMPT TO STOP THE INSTALLATION BEFORE COMPLETION!***
13.		If the PMC Firmware upgrade has not been updated, the following PMC message is displayed: 
14.	Disconnect all peripherals from the USB and PCMCIA. Move cursor over the displayed window and press the SET button.	The following message is displayed 

Table 8-2 Vivid S5 N and Vivid S6 N Software Re-Installation (cont'd)

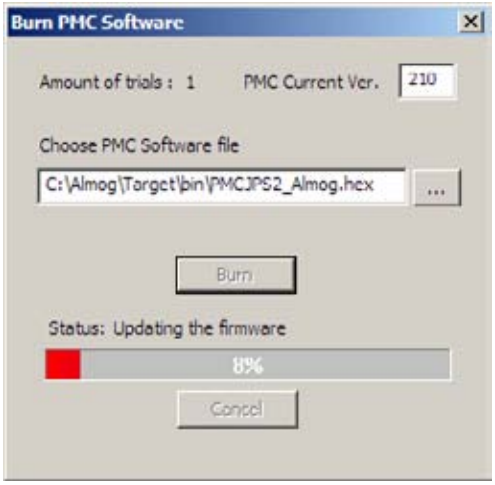
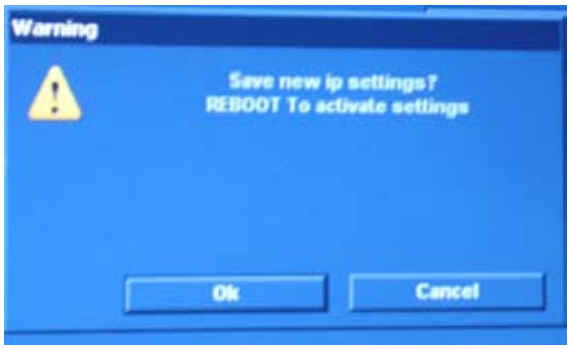
Step	Instruction	Expected Result
15.	Press any key to begin the PMC upgrade.	The PMC upgrade commences and the following screen with current PMC version and colored progress bar is displayed:  Note: If this screen fails to appear, refer to "Installation of PMC Version" on page 8-196. When done (after several minutes), the screen will turn blank and the fans will continue running.
16.	Power down the system by removing the AC adapter from the rear of the system. Wait 10 seconds, then re-connect the battery and the AC adapter. Boot-up the system by pressing the On/Off button.	If this is a new installation, the system will prompt for the software licence Password, as shown below. Proceed to step 17. If not a new installation, there is no prompt for the software licence Password and the boot-up screen is displayed (see below). Proceed to step 18.
17.	Type the password provided for the specific software and approve by clicking **OK**.	The system will continue to boot-up into *Normal Scanning* mode:
18.	From the System Configuration window, click the **Connectivity** tab at the bottom of the window.	The Connectivity dialog box opens.

Table 8-2 Vivid S5 N and Vivid S6 N Software Re-Installation (cont'd)

Step	Instruction	Expected Result
19.	Navigate to the **TCPIP** tab and press the **Set** button on the control panel.	Connectivity dialog box - TCPIP tab activated:
20.	Navigate to the **Save Settings** button and press the **Set** button on the control panel.	A message is displayed prompting for system re-boot: 
21.	Click **OK** to re-boot the system.	When the installation process is complete, the system will re-boot in regular display mode (Probe Select Screen). Note: If this is a new software version, an adhesive Rating Plate is supplied with the software CD. Adhere the plate in the appropriate position under the Bottom Assembly.
22.	Proceed to perform the following functionality tests: • "Software Configuration Checks" on page 4-36 • "Calibration Tests" on page 7-24 • "Full System Test" on page 7-9	

8-8-2 Setting the BIOS

NOTE: This procedure is applicable to MODBR964 version.

NOTE: To reset the BIOS password, one can remove the real time battery for a period longer than 10 secs, then reconnect it. (It is recommended to replace the battery once every 2 years).

1) While booting, press F2 “Config / Diag” on alphanumeric keyboard
2) Type the password “**marlin04**”.
3) Exit and save presets.
4) Select <Exit> section and load “Setup Defaults”.
5) Select <Main> section.
6) Set correct system time and Date. Set Date using next format MM/DD/YYYY
7) Check that IDE primary master is detected.
8) Select <Advanced> section
9) Perform the following changes in the “*Advanced*”:

Option	Value
\Advanced\PnP OS Installed	No
\Advanced\Secured Setup Configuration	No
\Advanced\PCI configuration\Assign IRQ to PCI VGA	No
\Advanced\IO Device Configuration\Serial Port A	Enabled
\Advanced\IO Device Configuration\Serial Port B	Enabled
\Advanced\IO Device Configuration\OnChip Audio Device	Enable

10) Perform the following changes in the <*Security*>:

Option	Value
\Security\Set Supervisor Password	marlin04
\PNP/PCI\IDE DMA transfer access	Enabled

11) Perform the following changes in the <*Power*>

Option	Value
\Power\Wake Up Events\IRQ1	Disabled
\Power\Wake Up Events\IRQ12	Disabled
\Power\Wake Up on LAN	Disabled

12) Perform the following changes in the <*Boot*>:

Option	Value	Comments
\Boot\ATX AC Power Boot Mode	Desktop	
\Boot\Boot Device Priority		
\Boot\ Boot Device Priority 1 - st Boot device	CDROM Drive	Highlight CDROM Drive, Hold Shift Button and Press “+” to move to upper position
\Boot\ Boot Device Priority 2 – nd Boot device	Hard Drive	
\Boot\ Boot Device Priority 3 –rd Boot Device Removable Devices		
\Boot\ Boot Device Priority\Network Boot		
\Boot\Display Control\LCD Brightness	255	Hold Shift and press “+” button to set value

13) Save and exit BIOS Setup.

14.) Reboot the system and check that Supervisor PASSWORD was installed properly.

15.) Proceed to perform the following functionality tests:

- - “Software Configuration Checks” on page 4-36
- - “Calibration” on page 7-10
- - “Full System Test” on page 7-9

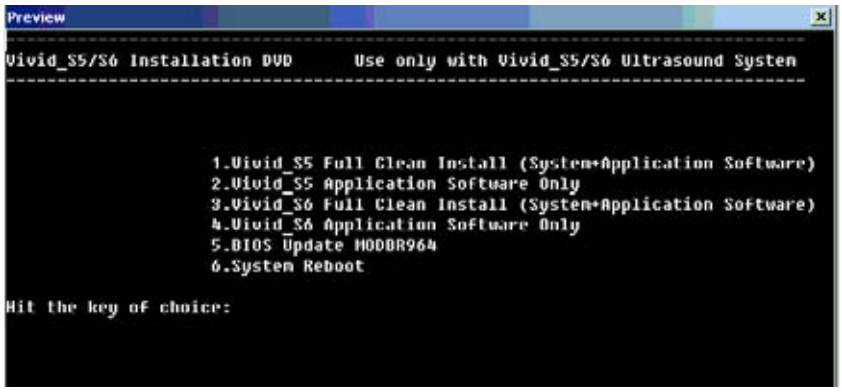
8-8-3 BIOS Firmware Update

WARNING: When performing this procedure, it is strongly recommended that AC power is always available to the scanner to prevent causing problems in the Back End in the event of AC power fluctuation or power failure.

In addition, BIOS Firmware Update is a sensitive procedure; allow the process to run to completion without interruption. *Failure to do this could result in unrecoverable damage to the system!*

1) Make sure the scanner is connected to AC power.
2) Insert the Vivid S5 N or Vivid S6 N software installation CD in the DVD\CD-R drive.
3) Hold down the ON/OFF button on the control console for 3 seconds.

   The system powers ON and when system boot-up from the CD is complete, the following options are displayed in the DOS screen, prompting you to select the required option:

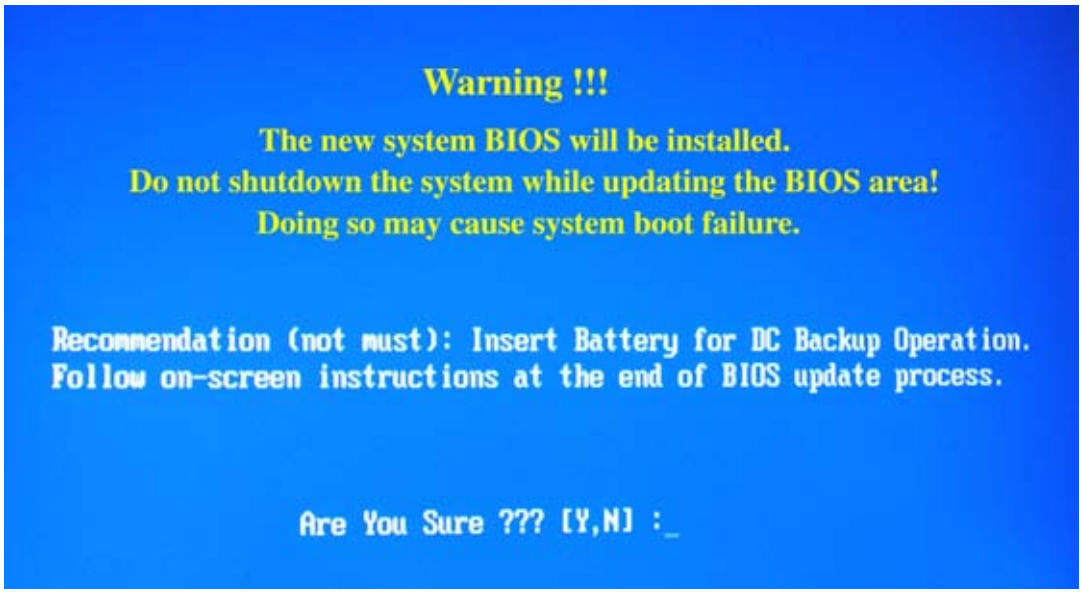

Preview
Vivid_S5/S6 Installation DVD Use only with Vivid_S5/S6 Ultrasound Systen
1.Vivid_S5 Full Clean Install (System+Application Software)
2.Vivid_S5 Application Software Only
3.Vivid_S6 Full Clean Install (System+Application Software)
4.Vivid_S6 Application Software Only
5.BIOS Update MODBR964
6.System Reboot
Hit the key of choice:

4) Select option: **5: BIOS Update MODBR964**

   A prompt for password is displayed:

5) Type **geulsservice** and press <**Enter**>.

*The following screen opens displaying a flashing **Warning** message not to shutdown the system during this procedure*:


Warning !!!
The new system BIOS will be installed.
Do not shutdown the system while updating the BIOS area!
Doing so may cause system boot failure.
Recommendation (not must): Insert Battery for DC Backup Operation.
Follow on-screen instructions at the end of BIOS update process.
Are You Sure ??? [Y,N] :_

Note: use of the battery for DC backup during this procedure is also recommended in this screen.

6) To continue, type **Y**.

The following screen is displayed, showing the progress of the BIOS update process:

Phoenix Phlash16 Utility Version 1.4. Build 57
Copyright (c) Phoenix Technologies Ltd., 2002
Performing the following function
√ Load Image file (BIOS.WPH)
√ Verify interface information
. Backup system BIOS ROM
√ Check flash memory type(s)
▸ Flash memory block: 0123456789ABCDEF
Save block
Restore block
Zero out block
Erase block
Program block
Verify block
Flash programming complete
98% Programmed
New BIOS Date, Time, Part Number: 02/20/07 00:40:16 MODDR9G4
Flash part: STM50FW800 DeviceID: 2d Mfr.ID: 20
PROGRAMMING block at FFF80000 from 080000 with 80000 bytes
15:07:40(18)

Figure 8-213 BIOS Update in Progress

When the BIOS Update process is complete, the following message is displayed:

Phoenix Phlash16 Utility Version 1.4. Build 57
Phoenix Phlash16 Status
Flash memory has been successfully programmed
PRESS ANY KEY TO RESTART THE SYSTEM
If the system does not restart
TURN THE POWER OFF, THEN ON

7) Press any key to restart the system.

The boot-up screen is displayed, as shown in Figure 8-214 on page 8-183.

Note: If the system does not restart, turn the power OFF, then ON. (In the event that the system boot-up screen is not displayed, repeat the procedure, from step 1).

Figure 8-214 Boot-up Screen after Completion of BIOS Update

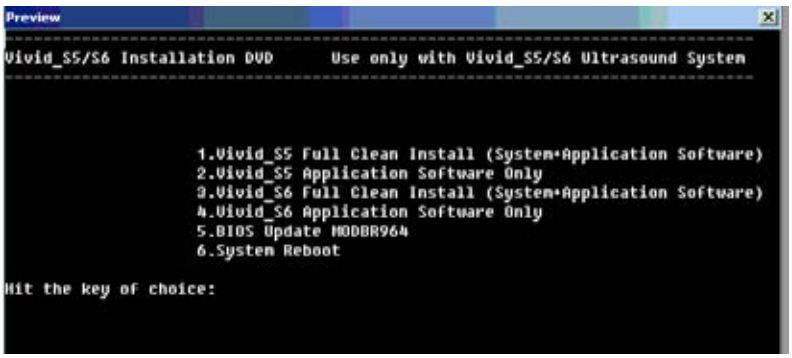
8.) Proceed to perform the following functionality tests:

- - "Software Configuration Checks" on page 4-36
- - "Calibration" on page 7-10
- - "Full System Test" on page 7-9

8-8-4 Formatting and Partitioning the Hard Disk - Automatic Procedure

1) Connect the DVD\CD-RW drive to the system's USB and connect the power supply of the drive to power outlet.
2) Place the GHOST CD in the DVD\CD-RW drive.
3) Turn ON power to the system and allow it to boot up from the CD.

   A menu will appear prompting for selection of one of four options:


Preview
Vivid_S5/S6 Installation DVD Use only with Vivid_S5/S6 Ultrasound System
1.Vivid_S5 Full Clean Install (System+Application Software)
2.Vivid_S5 Application Software Only
3.Vivid_S6 Full Clean Install (System+Application Software)
4.Vivid_S6 Application Software Only
5.BIOS Update MODBR964
6.System Reboot
Hit the key of choice:

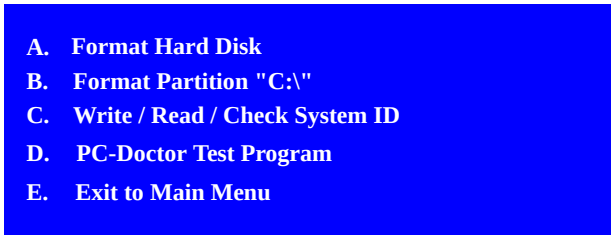
4) Select the appropriate option:
   - *For a Vivid S5 N system:* **1. Vivid_5 Full Clean Install (System + Application Software**)
   - *For a Vivid S6 N system:* **3. Vivid_6 Full Clean Install (System + Application Software**)

NOTE: In this procedure, the examples shown are for a Vivid S6 N system.

A menu will appear prompting for selection of the required option:

5) Select "**B**" service tools.
6) Type in the password "**geulsservice**" and press <**Enter**>.

   A menu will appear prompting for selection of one of five options:



7) Select "**A**" to format and re-partition the complete hard disk.

8-8-4 Formatting and Partitioning the Hard Disk - Automatic Procedure (cont'd)

NOTE: Note the system will partition hard disk as follows:
C: = 3GB
D: = 5GB
F: = 1GB
E: = Remaining space (i.e. complete hard-disk size minus 9GB for partitions C, D, and F).

IMPORTANT: ***Do not stop the operation during this process!***

8) When complete, continue with the software installation procedure. Refer to the relevant section.

NOTE: In the event that the above process fails, one can perform the hard-disk partitioning procedure manually, as described below.

9.) When done, proceed to perform the following functionality tests:

- - "Software Configuration Checks" on page 4-36
- - "Calibration" on page 7-10
- - "Full System Test" on page 7-9

8-8-5 Formatting and Partitioning the Hard Disk - Manual Procedure

1) Insert the Vivid S5 N or Vivid S6 N software installation CD in the DVD\CD-R drive.

2) Hold down the ON/OFF button on the control console for 3 seconds.

   The system powers ON and when system boot-up from the CD is complete, the following options are displayed in the DOS screen, prompting you to select the required option:

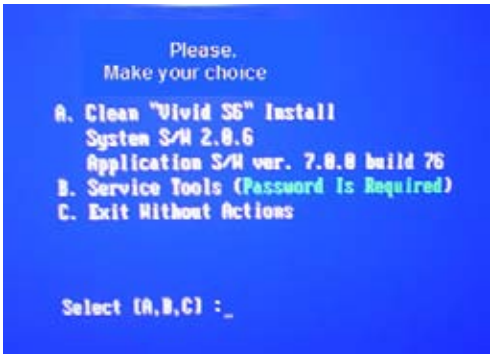
Preview
Vivid_S5/S6 Installation DVD Use only with Vivid_S5/S6 Ultrasound System
1.Vivid_S5 Full Clean Install (System+Application Software)
2.Vivid_S5 Application Software Only
3.Vivid_S6 Full Clean Install (System+Application Software)
4.Vivid_S6 Application Software Only
5.BIOS Update H0DBR964
6.System Reboot
Hit the key of choice:

3) Select the appropriate option:

   - *For a Vivid S5 N system:* **1. Vivid_5 Full Clean Install (System + Application Software**)
   - *For a Vivid S6 N system:* **3. Vivid_6 Full Clean Install (System + Application Software**)

NOTE: In this procedure, the examples shown are for a Vivid S6 N system.

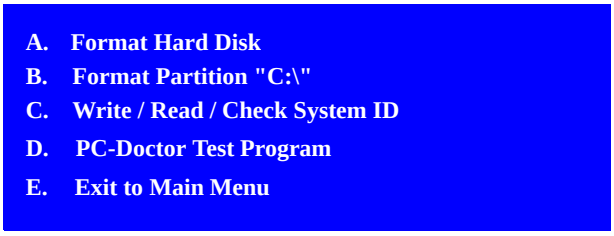
A menu will appear prompting for selection of the required option:



4) Select option **B Service Tools**.

5) When prompted for the password, type **geulsservice** and press <**Enter**>.

   The message "*Loading Tools please wait*" is displayed, then the *Service Tools Options* menu opens:



6) Do not select an option, but press **<Ctrl> + C**.

8-8-5 Formatting and Partitioning the Hard Disk - Manual Procedure (cont'd)

7) When the message *"EMM386 is running. Available memory is limited to 32MB*" is displayed, click **OK**.

8) When the message "*Terminate batch job (Y/N?)*" is displayed, type **Y**.

9) At the prompt A:\> type **pqmagic** and press <**Enter**>.

   The *Partition Magic* Screen is displayed, as shown below.

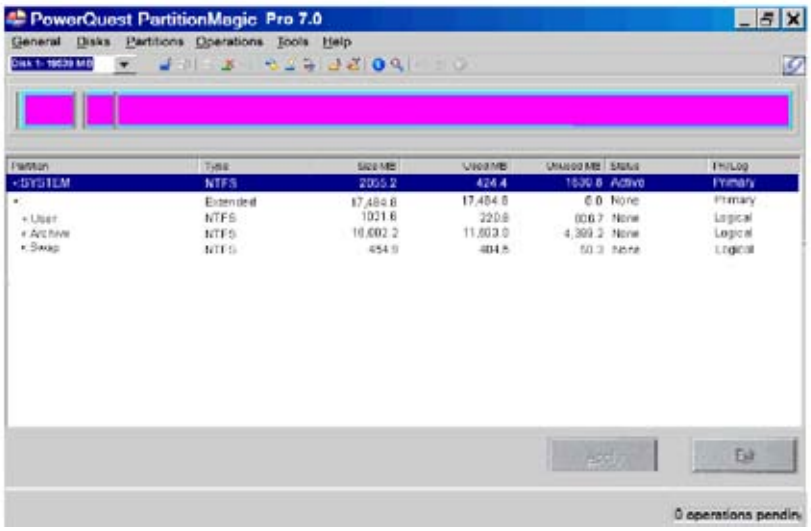


Figure 8-215 Partition Magic Screen

10) With the *System* partition selected (highlighted, as shown in Figure 8-215), delete the partition by selecting the **Delete** Tool under the *Operations* menu, as shown in Figure 8-216 below:

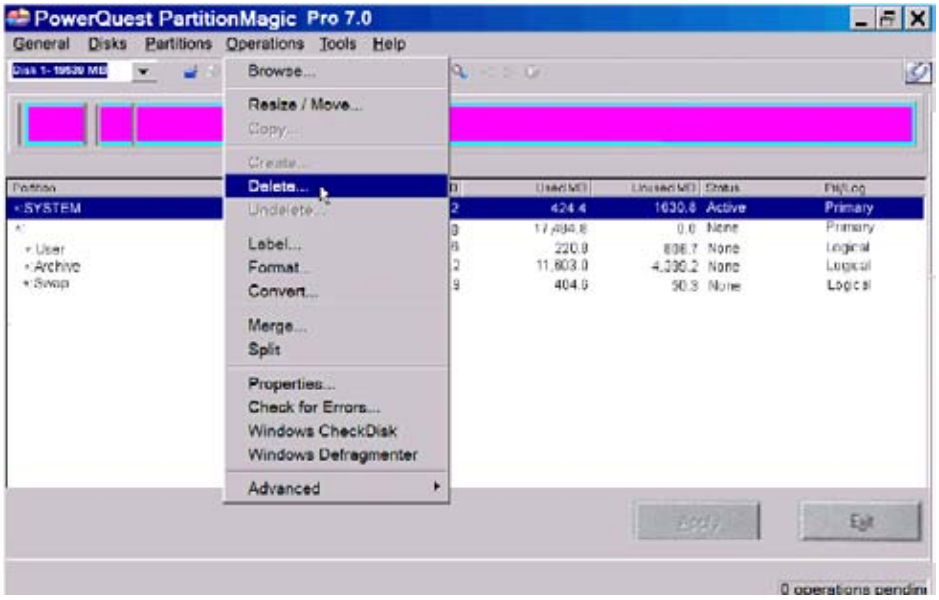


Figure 8-216 Operations Menu

8-8-5 Formatting and Partitioning the Hard Disk - Manual Procedure (cont'd)

11) When prompted for confirmation of the deletion, click **OK**.

12) Repeat step 10 and step 11 to select and delete each of the remaining partitions in turn, including the partition type *Extended*.

    The non-partitioned hard disk will now be shown on the Partition Magic Screen with all disk space listed as *Unallocated* (for example, 19,594.9 MB).

13) With *Unallocated* selected (highlighted), create the first partition by selecting the **Create** Tool under the *Operations* menu, as shown below:

14) In the dialog box displayed, select the following:

    Partition: **Primary Partition**

    Partition Type: **NTFS**

15) Type the Label as: **SYSTEM**

16) Type the size required. This should be at least 3GB (up to 4GB).

17) Activate the **Beginning of Unallocated** checkbox.

18) When done, click **OK**.

    The System partition and allocated space is now listed in the *Partition Magic Screen*.

19) With the System partition selected (highlighted), select the **Advanced Tool** under the *Operations* menu.

20) In the dialog box displayed, click **Set Active**, then click **OK**.

21) When the message "*Are you sure you want to change the active partition?"* is displayed, click **OK**.

22) With **Unallocated** selected in the *Partition Magic Screen*, repeat step 15 and step 16 to create the next partition, using the following:

    Partition: **Logical Partition**

    Partition Type: **NTFS**

23) Type the Label as: **USER**

24) Type the size required. This should be at least 5GB (up to 6GB).

25) Activate the **Next Unallocated** checkbox.

8-8-5 Formatting and Partitioning the Hard Disk - Manual Procedure (cont'd)

26) When done, click **OK**.

The User partition and allocated space is now listed in the *Partition Magic Screen*.

27) With **Unallocated** selected in the *Partition Magic Screen*, repeat step 15 and step 16 to create the next partition, using the following:

Partition: **Logical Partition**

Partition Type: **NTFS**

28) Type the Label as: **SWAP**

29) Type the size required. This should be 1/2 to 1GB - for example, 1022.6.

30) Activate the **End of Unallocated** check box, then click **OK**.

The Swap partition and allocated space is now listed in the *Partition Magic Screen*.

31) With **Unallocated** selected in the *Partition Magic Screen*, repeat step 15 and step 16 to create the next partition, using the following:

Partition: **Logical Partition**

Partition Type: **NTFS**

32) Type the Label as: **ARCHIVE**

NOTE: The Archive size will be any remaining space (for example, 14,456.9), therefore do not type over the value displayed.

The Archive partition and allocated space is now listed in the *Partition Magic Screen*.

33) Click the **Apply** button at the lower right of the screen.

The Batch progress menu is displayed.

34) When the message "*All operations complete*" is displayed, click **OK**.

35) Click **Exit**.

36.) Proceed to perform the following functionality tests:

- - "Software Configuration Checks" on page 4-36
- - "Calibration" on page 7-10
- - "Full System Test" on page 7-9

8-8-6 Installing Software only from DVD

NOTE: During software installation, all peripherals should be removed - including PCMCIA devices (but excluding the DVD\CD-RW driver).

1) Connect the DVD\CD-RW to the USB port at the rear of the system.
2) Connect power to the DVD\CD-RW drive.
3) Place the DVD containing the full software version into the *DVD\CD-RW* drive.
4) Turn ON the system and allow it to boot-up from the DVD.

   The system powers ON and when system boot-up from the DVD is complete, the following options are displayed in the DOS screen, prompting you to select the required option:

Preview
Vivid_S5/S6 Installation DVD Use only with Vivid_S5/S6 Ultrasound System
1.Vivid_S5 Full Clean Install (System+Application Software)
2.Vivid_S5 Application Software Only
3.Vivid_S6 Full Clean Install (System+Application Software)
4.Vivid_S6 Application Software Only
5.BIOS Update MODBR964
6.System Reboot
Hit the key of choice:

5) Select the appropriate option:
   - *For a Vivid S5 N system:* **2. Vivid_S5 Application Software Only**
   - *For a Vivid S6 N system:* **4. Vivid_S6 Application Software Only**

NOTE: In this procedure, the examples shown are for a Vivid S6 N system.

The system will continue to boot up and the following screen is displayed

.

8-8-6 Installing Software only from DVD (cont'd)

When done, the Start Application screen is displayed, as shown in Figure 8-217.

Figure 8-217 Start Application Screen

6) Click on **Install SW** and follow the on-screen instructions.

A warning message is displayed, as shown in Figure 8-218.

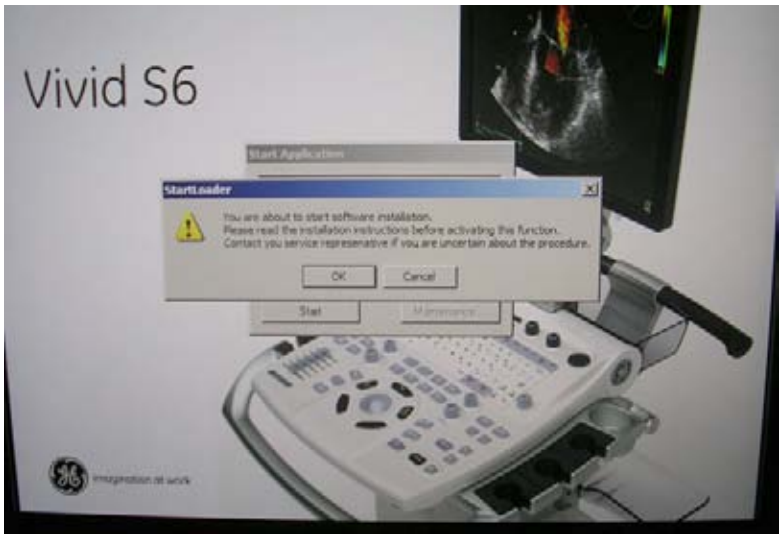

Vivid S6
StartLoader
You are about to start software installation.
Please read the installation instructions before activating this function.
Contact you service representative if you are uncertain about the procedure.
OK
Cancel
Start

Figure 8-218 Start Software Installation Message

8-8-6 Installing Software only from DVD (cont'd)

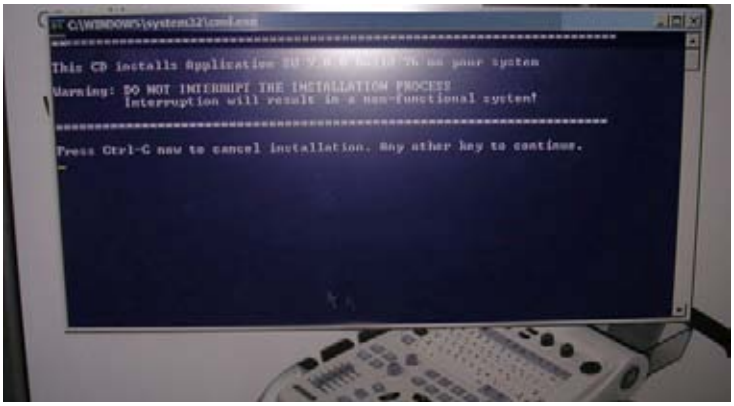
7) Click **OK**.

The following message is displayed:

8) Click **OK** to continue.

The following warning message is displayed:

:

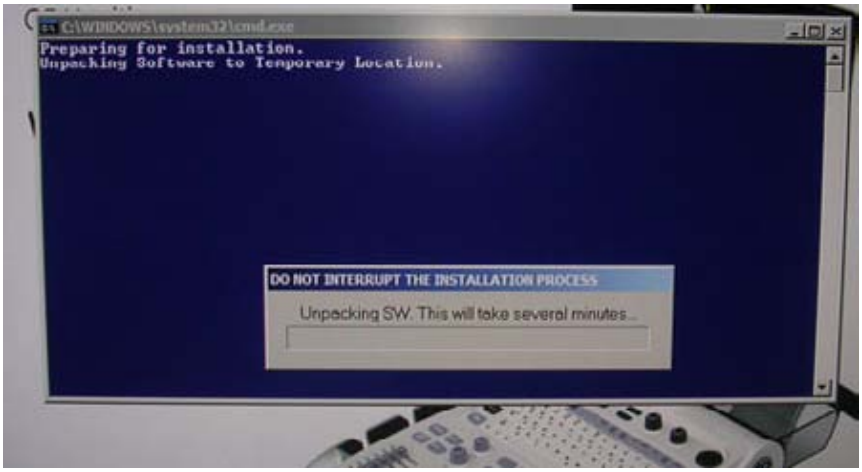

This CD installs Application
Warning: DO NOT INTERRUPT THE INSTALLATION PROCESS
Interruption will result in a non-functional system!
Press Ctrl-C now to cancel installation. Any other key to continue.

WARNING: DO NOT INTERRUPT THE INSTALLATION PROCESS. Interruption will result in a non-functional system!

9) Press any key to continue.

8-8-6 Installing Software only from DVD (cont'd)

Installation commences and the following message is displayed:


Preparing for installation.
Unpacking Software to Temporary Location.
DO NOT INTERRUPT THE INSTALLATION PROCESS
Unpacking SW. This will take several minutes...

When done, the Installation Complete message is displayed:

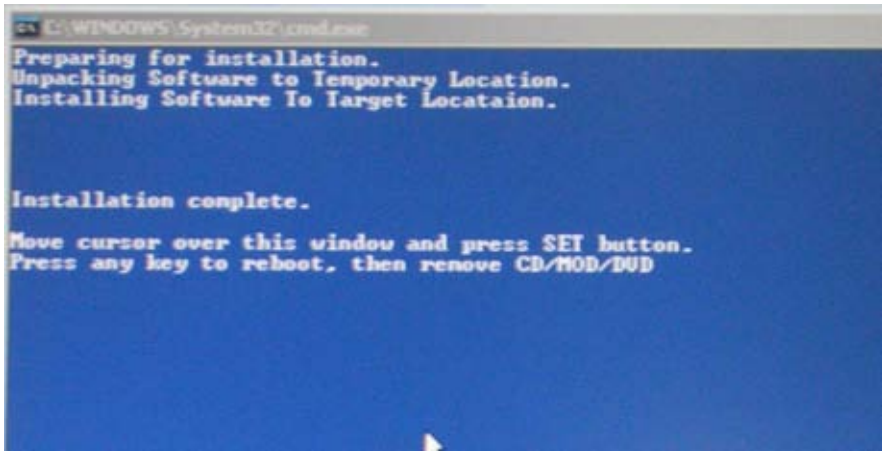

Preparing for installation.
Unpacking Software to Temporary Location.
Installing Software To Target Locataion.
Installation complete.
Move cursor over this window and press SET button.
Press any key to reboot, then renove CD/MOD/DVD

Figure 8-219 Software Installation Complete Message

10) Move the cursor over the displayed message window and press the **SET** button.

11.) Press any key to re-boot the system.

The system re-boots into Normal Scanning mode.

12.) Press **Config** and then **About**.

8-8-6 Installing Software only from DVD (cont'd)

The newly-installed software version is now listed under the System Version tab:

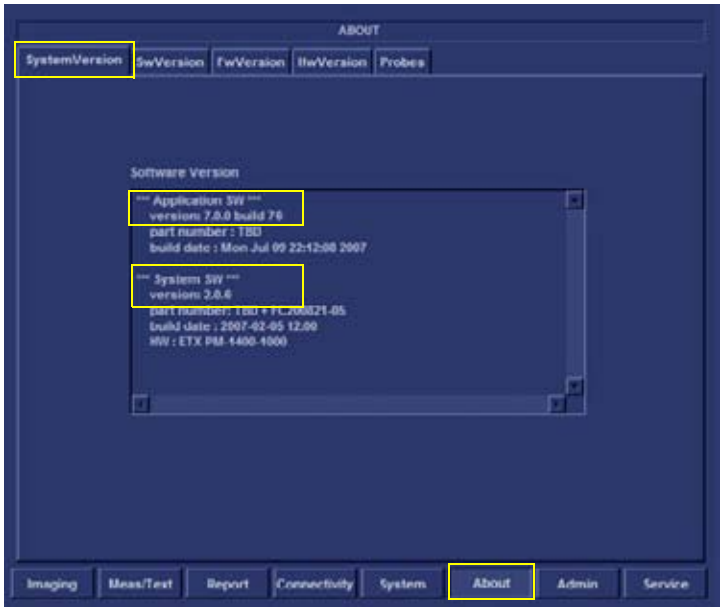


Figure 8-220 Software Version

13.) Remove the DVD from the *DVD\CD-RW* drive.

14.) Proceed to perform the following functionality tests:

- - "Software Configuration Checks" on page 4-36
- - "Calibration" on page 7-10
- - "Full System Test" on page 7-9

8-8-7 Installing Software only or Patch

1) Connect the DVD\CD-RW to the system's USB port.
2) Connect the DVD\CD-RW power supply to the mains power.
3) Place the *CD with Patch* or *Software Only* CD into the *DVD\CD-RW* drive.
4) Turn ON the system.

   During boot-up, system will prompt to install software or continue booting into regular mode.
5) Click on **Install Software** and follow the on-screen instructions.
6.) When done, the Installation Complete message is displayed (refer to Figure 8-219 on page 8-193).
7) Move the cursor over the displayed message window and press the **SET** button.
8.) Press any key to re-boot the system.

   The system re-boots into Normal Scanning mode.
9.) Press **Config** and then **About**.

   The newly-installed software version is now listed under the System Version tab (refer to Figure 8-220 on page 8-194).
10.) Remove the CD from the *DVD\CD-RW* drive.
11.) Proceed to perform the following functionality tests:
   - - "Software Configuration Checks" on page 4-36
   - - "Calibration" on page 7-10
   - - "Full System Test" on page 7-9

8-8-8 Installation of PMC Version

1.) Allow the system to boot up into *Normal Scanning* mode.

2) Press **Config**.

The system will prompt you to login.

3) Login as **ADM**.

The default password is **ulsadm**

4) Press the **About** button and activate the **FwVersion** tab; verify that PMC version is 202 or above. If the version is lower than 202 (as shown in the example in Figure 8-221 below), proceed to the next step.

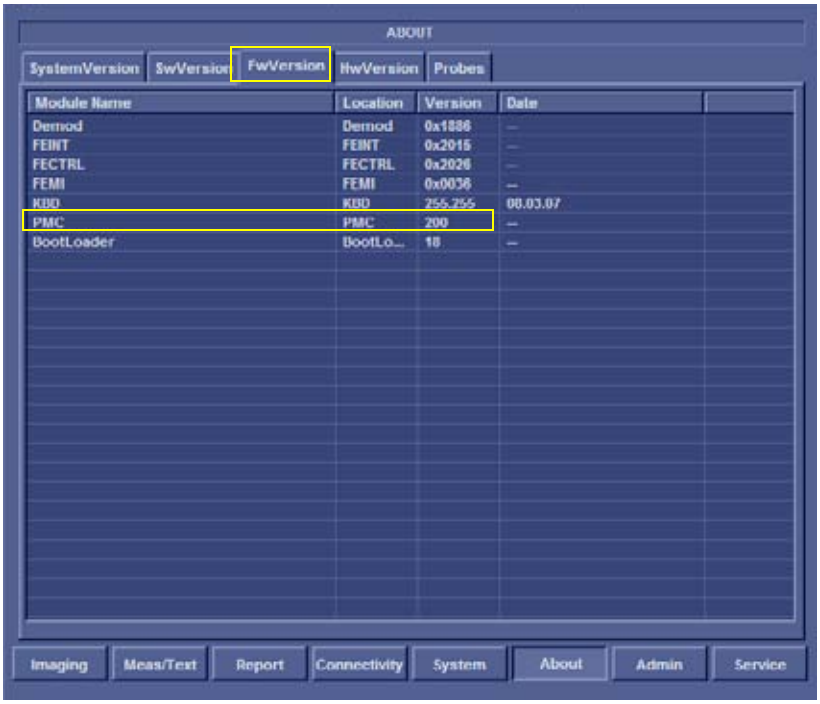


Figure 8-221 Verifying PMC Version

5) Turn the system OFF and remove the DVD USB cable and AC adapters.

6) Connect the AC adapter **only** (NO BATTERY).

7) Boot up the system in **Maintenance** mode, using the Service Dongle.

8) Go to the following directory: My Computer **C:\Almog\Target\bin**.

8-8-8 Installation of PMC Version (cont'd)

9) Run **PMCbootloader.exe** by double-clicking on it - see Figure 8-222 below.

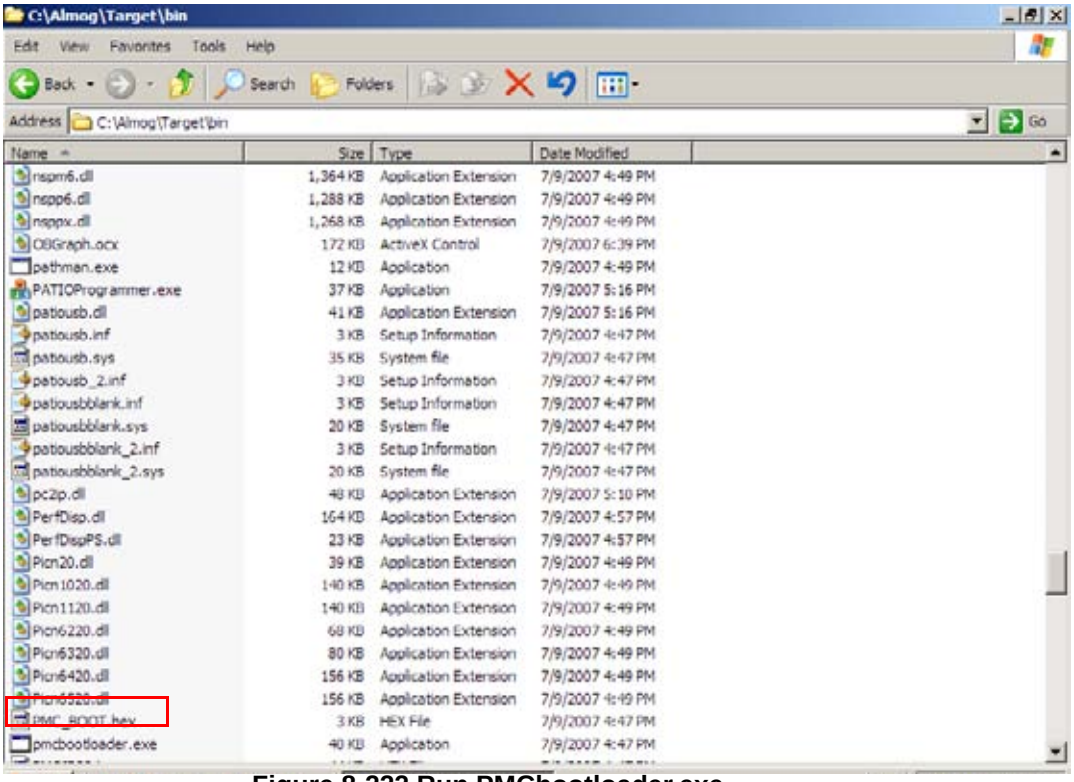
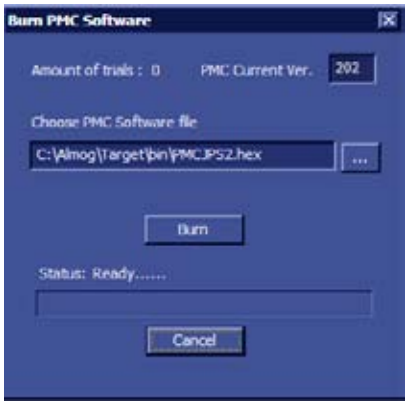

C:\Almog\Target\bin
Edit View Favorites Tools Help
Back Search Folders
Address C:\Almog\Target\bin
Go
Name Size Type Date Modified
nspm6.dll 1,364 KB Application Extension 7/9/2007 4:49 PM
nspp6.dll 1,288 KB Application Extension 7/9/2007 4:49 PM
nsppx.dll 1,268 KB Application Extension 7/9/2007 4:49 PM
OBGraph.ocx 172 KB ActiveX Control 7/9/2007 6:39 PM
pathman.exe 12 KB Application 7/9/2007 4:49 PM
PATIOProgrammer.exe 37 KB Application 7/9/2007 5:16 PM
patiousb.dll 41 KB Application Extension 7/9/2007 5:16 PM
patiousb.inf 3 KB Setup Information 7/9/2007 4:47 PM
patiousb.sys 35 KB System file 7/9/2007 4:47 PM
patiousb_2.inf 3 KB Setup Information 7/9/2007 4:47 PM
patiousbblank.inf 3 KB Setup Information 7/9/2007 4:47 PM
patiousbblank.sys 20 KB System file 7/9/2007 4:47 PM
patiousbblank_2.inf 3 KB Setup Information 7/9/2007 4:47 PM
patiousbblank_2.sys 20 KB System file 7/9/2007 4:47 PM
pc2ip.dll 48 KB Application Extension 7/9/2007 5:10 PM
PerfDisp.dll 164 KB Application Extension 7/9/2007 4:57 PM
PerfDispPS.dll 23 KB Application Extension 7/9/2007 4:57 PM
Picn20.dll 39 KB Application Extension 7/9/2007 4:49 PM
Picn1020.dll 140 KB Application Extension 7/9/2007 4:49 PM
Picn1120.dll 140 KB Application Extension 7/9/2007 4:49 PM
Picn6220.dll 68 KB Application Extension 7/9/2007 4:49 PM
Picn6320.dll 80 KB Application Extension 7/9/2007 4:49 PM
Picn6420.dll 156 KB Application Extension 7/9/2007 4:49 PM
Picn6520.dll 156 KB Application Extension 7/9/2007 4:49 PM
PMC_BOOT.hex 3 KB HEX File 7/9/2007 4:47 PM
pmcbootloader.exe 40 KB Application 7/9/2007 4:47 PM

Figure 8-222 Run PMCbootloader.exe

A window is displayed showing the current PMC version and the path of the PMCJPS2.hex file:



10.) Click **Burn**.

The PMC upgrade will begin; a progress bar is displayed as shown in Figure 8-223 on page 8-198.

8-8-8 Installation of PMC Version (cont'd)

Figure 8-223 PMC Upgrade in Progress

11) Wait until the progress bar reaches 100%.

The system will reboot into normal scanning mode.
Proceed to confirm the PMC version, as follows:

12) Press **Config**.

13) Press the **About** button and activate the **FwVersion** tab; verify that PMC version is now 202, as shown in the example in Figure 8-224 below.

Figure 8-224 Checking the PMC Version

8-8-8 Installation of PMC Version (cont'd)

NOTE: In the event that the PMC version is other than 202, burning has failed and it is necessary to repeat the procedure from step 5 above. Also, refer to the note below.

NOTE: ***When failing to load PMC version 23***
In some cases, PMC loading may fail. Failure is indicated when performing step 13 above if a value other than 202 is shown for the PMC version. In this case the process needs to be repeated. Other indications of failure are that the system does not shut down automatically (step 11 above), or there is a strange pattern on the display.
In the event that failure has occurred, perform a full shut-down (if necessary, remove the AC adapter if the system seems to be "frozen"). Re-boot the system in Maintenance mode, using the AC adapter only. Continue from step 5 above.

14.) Proceed to perform the following functionality tests:

- "Software Configuration Checks" on page 4-36
- "Standby Mode" on page 4-8
- "Complete Power Down" on page 4-9

8-8-9 Performing a Complete System Back-up

NOTICE **IMPORTANT**: Contact the customer and request that a full incremental back-up be performed prior to upgrade. If necessary, refer them to the Vivid S5 N or Vivid S6 N User Manual. Ask for removal (delete) of un-necessary patient information, so that the back-up process will require minimal time.

Remind customers that GE HEALTHCARE strongly recommends that periodic back-ups of their Archive be performed. This routine back-up process will assure the retention of all the information that is temporarily saved into the local Archive (hard-disk). The permanent Archive is the backed-up Archive on the variety of medias.

Do not proceed with the upgrade process if a complete incremental back-up process has not been performed. Contact the On-Line Center to resolve any back-up process issues, before proceeding with the upgrade. Ignore this note if back-up of patient information is not required, as per the customer's instructions.

8-8-10 Database Merge

The Database Merge process can be implemented by using the Import/Export functions of the Vivid S5 N or Vivid S6 N system, as described in the procedure below.

8-8-10-1 Database Merge Procedure

8-8-10-1-1 Logging on to the System

1.) Bootup the system using the service dongle.

The Maintenance Access dialog box opens.

2.) Enter the current applicable service password. Click **OK**.

3.) In the Start Application screen that is displayed, click **Start**.

The system opens at the default scanner screen.

NOTE: You can access the scanner default screen from the Windows Desktop as follows:

1.) Click the Windows **Start** button at the bottom left corner of your screen and select **Run** from the scroll-down menu.

2.) At the command prompt, type "**Echoloader /service**" and click **OK**.

The default scanning screen opens.

8-8-10-1-2 Running Disk Management

NOTE: See Disk Management in the Vivid S5™ or Vivid S6™ User's Manual on your document CD.

1.) From the console, press the **Patient** button - and on the screen, click **Patient List** - Figure 8-225.

Figure 8-225 Patients List

The soft key buttons shown in Figure 8-226 will be displayed on the screen.

Figure 8-226 Soft keys Displayed on Screen

2.) At bottom of screen click **More.**

The following soft key buttons are displayed - see Figure 8-227.

Figure 8-227 Disk Management Soft Key

3.) Click the **Disk Management** button on screen

The Disk Management dialog box opens - see Figure 8-228.

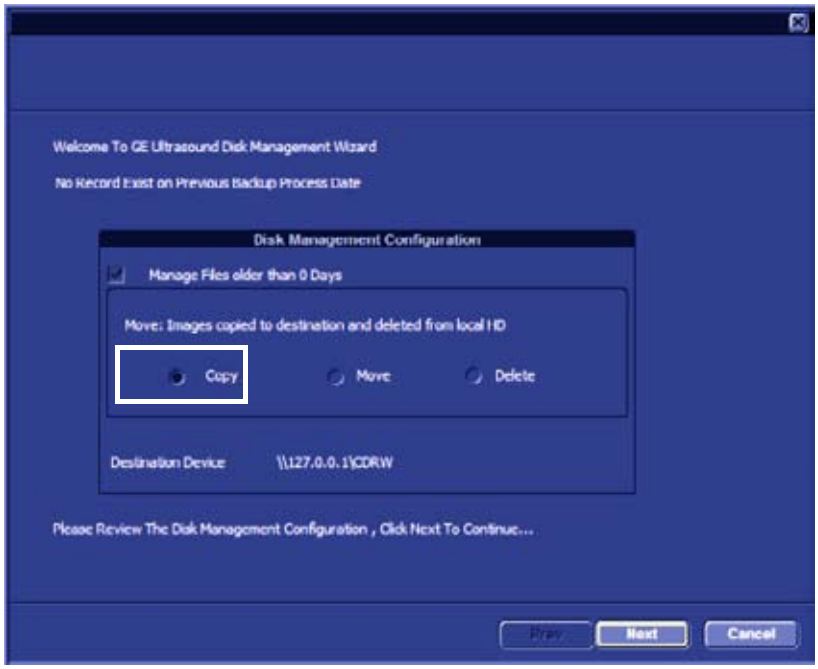


Figure 8-228 Disk Management Dialog Box

4.) Select the **Copy** option (Figure 8-228) and click **Next**.

The system saves the data to the selected media.

5.) Follow the on-screen instructions.

8-8-10-1-3 Running the Export Procedure

1.) Click the **Export** soft key at the bottom of the screen - Figure 8-229.

Figure 8-229 Export Soft Key

NOTE: The following warning is displayed - to indicate that only the database is exported to the target device.

Figure 8-230 Database Export Warning

2.) Follow the on-screen instructions.

3.) Click the **Copy** soft key on the screen and click **Done** - see Figure 8-231.

Figure 8-231 Copy Soft Key

4.) Press <**Alt> E** to eject the CD-DVD disc.

5.) Press the **2D** button on the console to return to the default scanner screen.

8-8-10-1-4 Running the Import Procedure

NOTE: This procedure is applied when importing files from various media devices.

1.) Log on to the system as described under Logging on to the System.

2.) From the console, press the **Patient** button - and on the screen, click **Patient List** (refer to Figure 8-225).

The Import Patient screen opens - Figure 8-232.

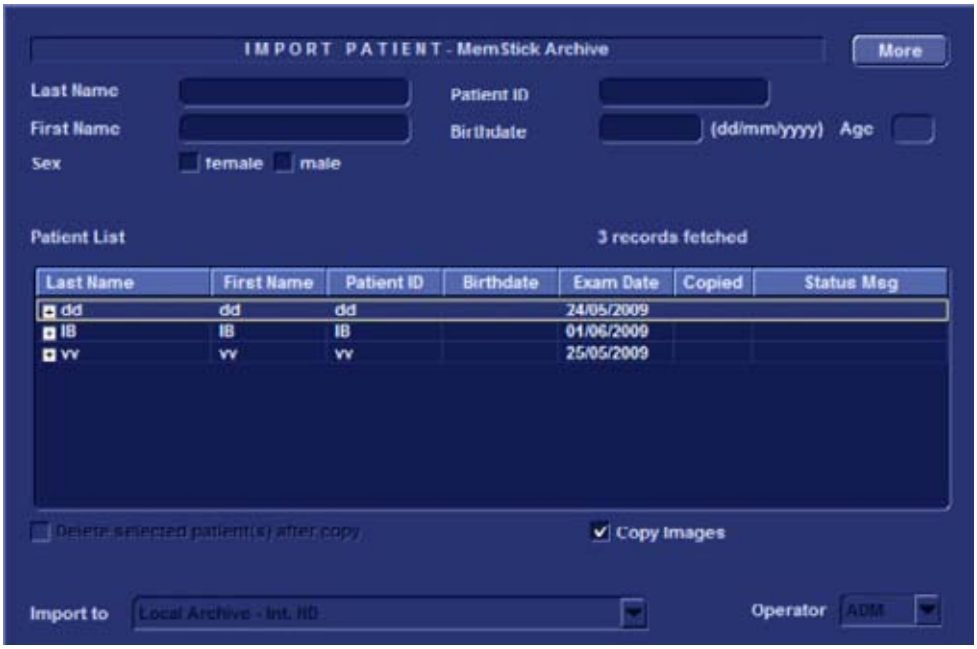


Figure 8-232 Import Patient Screen

3.) Select the required files to be imported.

NOTE: A warning is displayed - to indicate that only the database is imported to the target device.

Figure 8-233 Database Export Warning

4.) Click **OK**.

The Import Destination dialog box opens.

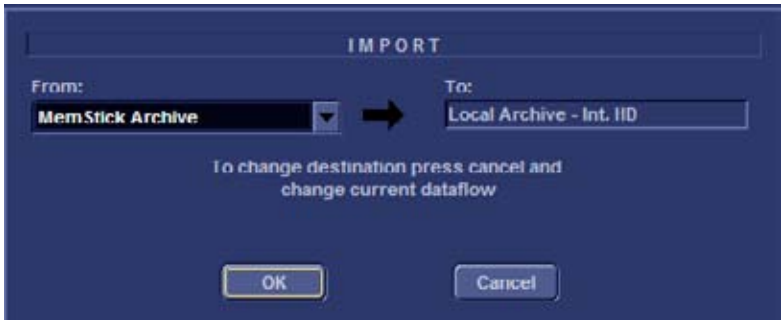


Figure 8-234 Import Destination Archive

5.) Select the required destination archive and click **OK**.

6.) Click the soft key **Copy** button.

When the copy process is completed, click **Done** (refer to Figure 8-231) to complete the procedure.

7.) Press **2D** on the console to return to the default scanner screen.

8-8-11 How to Restore User-defined Presets

For details, refer to “Restoring System Configuration from an MO Disk” on page 4-16.

Section 8-9
Peripherals - Replacement Procedures

8-9-1 Wireless USB Network Adaptor Replacement Procedure

NOTE: This section describes removal and replacement procedures only. For initial installation and configuration instructions, refer to the information provided in Chapter 3 - System Setup. See "Wireless Network Adaptor" on page 3-23 and "Wireless Network Configuration" on page 3-83.

Figure 8-235 Wireless USB Network Adaptor

8-9-1-1 Tools

None.

8-9-1-2 Time Required

Less than 1 minute

8-9-1-3 Preparation

Contact the local IT Manager to obtain all the security settings. These will be required when performing the Wireless USB Network Adaptor Installation Procedure.

8-9-1-4 Wireless USB Network Adaptor Removal Procedure

1.) Disconnect the USB connector from the USB port at the rear of the scanner, as indicated in Figure 8-236 on page 8-206
2.) Carefully remove the Wireless USB Network Adaptor from the system.

NOTE: Since the adaptor is secured to the scanner rear panel with velcro tape, it is only necessary to carefully pull the adaptor (together with the attached cable - see Figure 8-236) towards you to release if from the system.

8-9-1 Wireless USB Network Adaptor Replacement Procedure (cont'd)

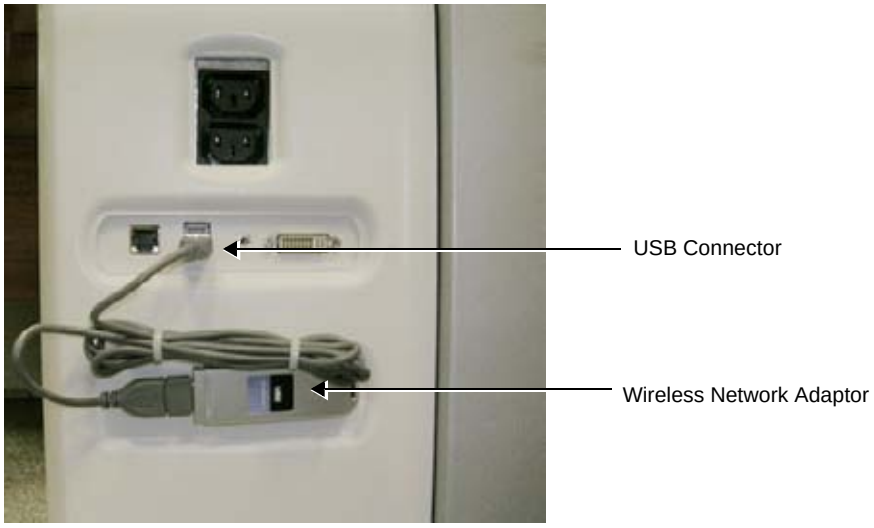


Figure 8-236 Wireless USB Network Adaptor Connected to Rear of Scanner

8-9-1-5 Wireless USB Network Adaptor Installation Procedure

1.) Place the Wireless USB Network Adaptor against the rear of the system with the velcro facing *towards* the scanner and the attached cable (secured with cable ties) positioned above the adaptor, as shown in Figure 8-236.

2.) Push the adaptor firmly against the rear panel making sure it is properly secured in position with the velcro tape.

3.) Re-connect the USB connector to the USB port - Figure 8-236.

NOTE: For configuration instructions, see "Wireless Network Configuration" on page 3-83.

4.) Proceed to perform the following functionality tests:

- "Grounding Continuity" on page 10-23
- "Chassis Current Leakage Test" on page 10-24

8-9-2 DVD/CD-RW Drive Replacement Procedure

8-9-2-1 Tools

Use the appropriate Phillips-type screwdrivers as indicated in the DVD/CD-RW Drive replacement procedure.

8-9-2-2 Time Required

20 minutes

8-9-2-3 Preparations

Shut down the Vivid S5 N or Vivid S6 N ultrasound unit, as described in *Chapter 3* - System Setup.

8-9-2-4 DVD/CD-RW Drive Removal Procedure

1) Remove the Vivid S5 N or Vivid S6 N left and right side covers, as described in the "Left Side Cover Removal Procedure" on page 8-6 and "Right Side Cover Removal Procedure" on page 8-5.
2) Remove the Vivid S5 N or Vivid S6 N front cover, as described in the "Front Cover Removal Procedure" on page 8-16.
3) Remove the bottom rear cover, as described in the "Bottom Rear Cover Removal Procedure" on page 8-21.
4.) Loosen and remove the two Phillips screws that secure the DVD cover in position (refer to Figure 8-24 on page 8-22) and remove the DVD Cover.
5.) Loosen and remove the two Phillips screws on either side of the securing panel (that holds the DVD /CD-RW Drive in position), as indicated in Figure 8-237.

.

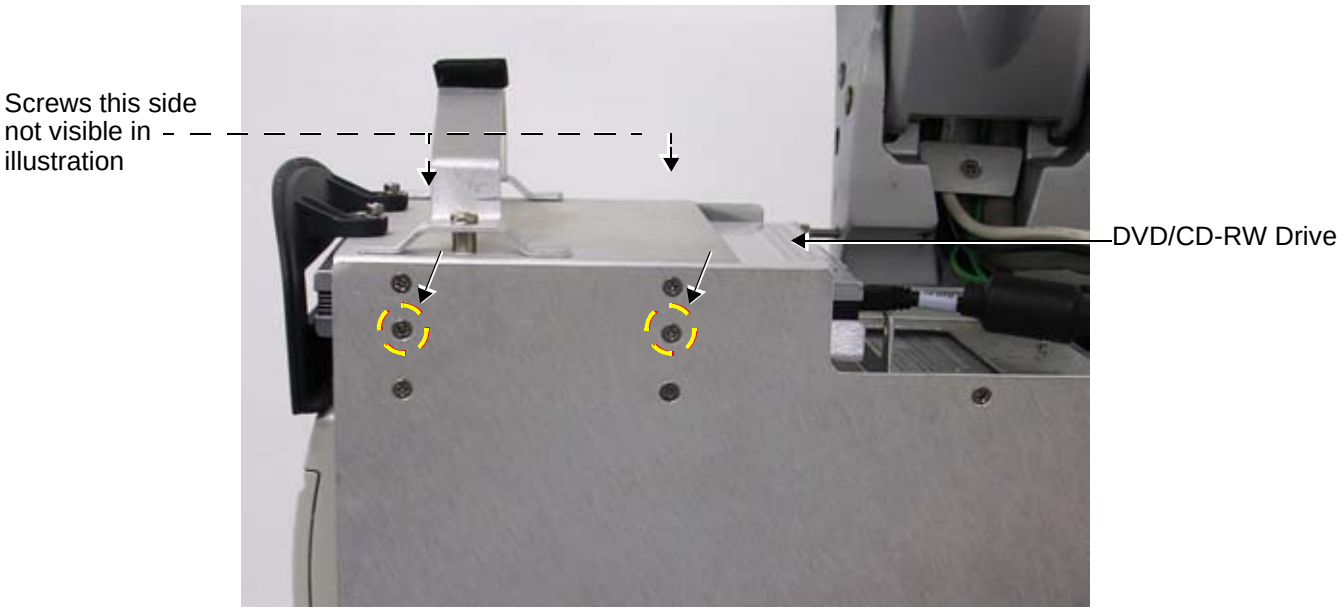


Figure 8-237 Screws Securing DVD/CD-RW Drive in Position

8-9-2 DVD/CD-RW Drive Replacement Procedure (cont'd)

6.) Disconnect the DVD USB cable and the DVD power cable from the rear of the DVD /CD-RW Drive, as indicated in Figure 8-218.

Figure 8-238 Mini USB Cable Connected at Rear of DVD/CD-RW Drive

7.) Slide the DVD /CD-RW Drive out to remove it from the compartment, as shown in Figure 8-239 .

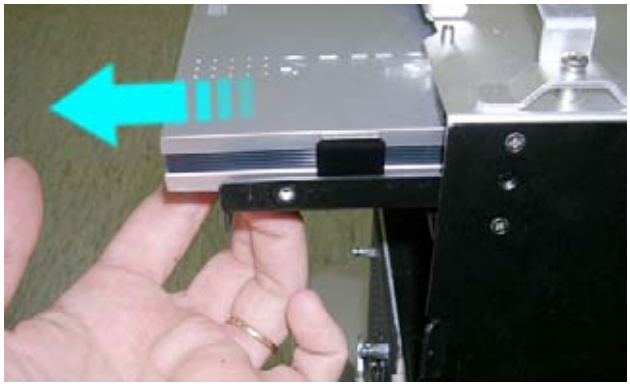


Figure 8-239 Removing the DVD/CD-RW Drive

8-9-2 DVD/CD-RW Drive Replacement Procedure (cont'd)

8-9-2-5 DVD/CD-RW Installation Procedure

1.) Carefully place the replacement DVD /CD-RW Drive into the compartment. Slide it all the way in, making sure it is properly seated against the rubber bumper at the rear of the compartment.

Note: When connecting the new USB cable, ensure that the USB connector is plugged into the vacant USB port on the chassis i.e. the port that was previously occupied by the old DVD/ CD cable.

2.) Connect the new DVD cable as follows:

a.) Plug the D-type connector into its connector on the Vivid S5 N/Vivid S6 Nchassis - see Figure 8-240.

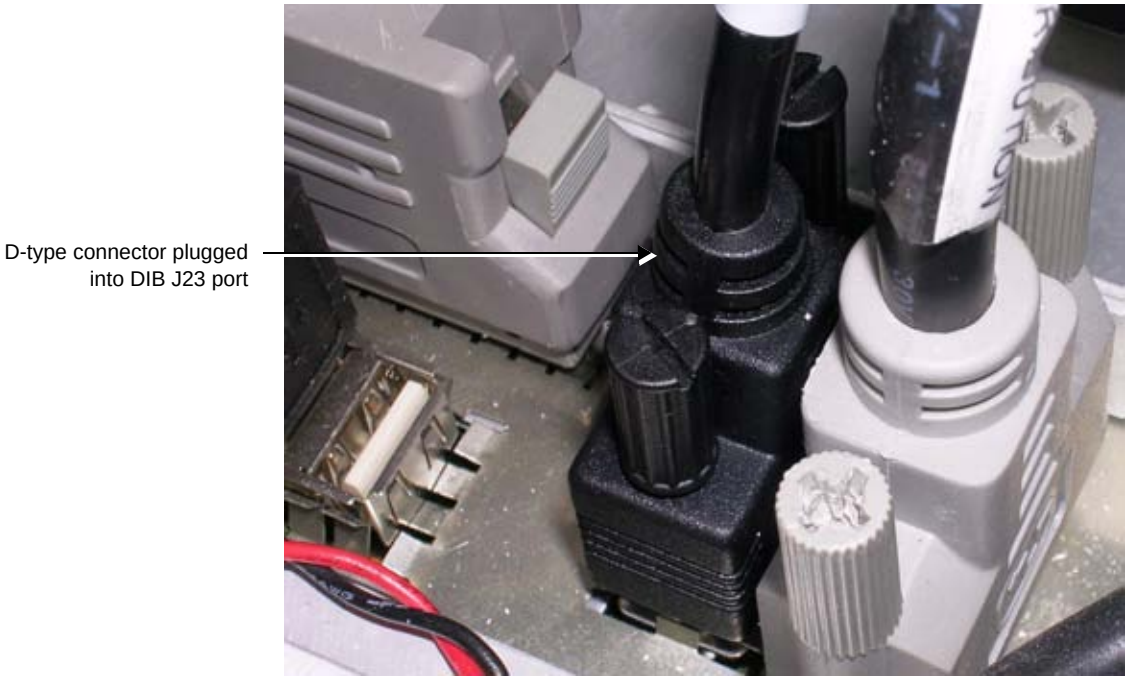


Figure 8-240 D-type Connector Plugged into the Vivid S5 N/Vivid S6 N System

b.) Plug the USB connector into the previously-vacated USB port on the Vivid S5/S6 chassis as shown in Figure 8-241.

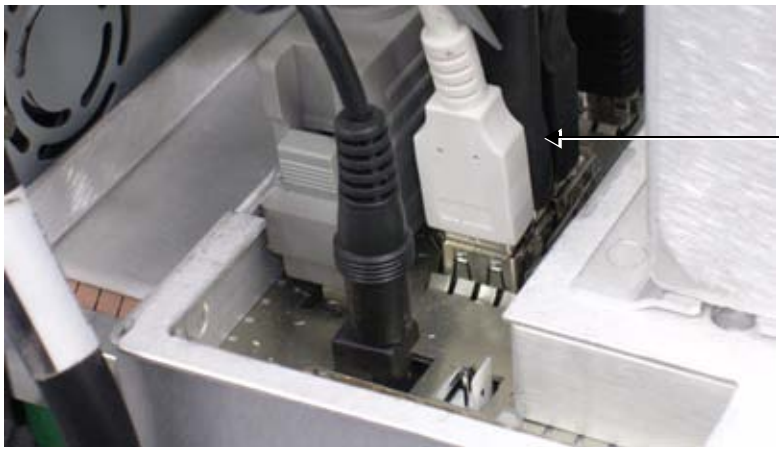


Figure 8-241 USB Connector Plugged into the USB Port

3.) Plug the mini USB connector into the DVD/CD port located at the rear of the DVD/CD drive as shown in Figure 8-242.

Figure 8-242 Mini USB Connector Plugged into DVD/CD

4.) Re-fit the DVD cover making sure it is seated correctly - then secure the DVD cover in position and tighten the two Phillips screws ((refer to Figure 8-24 on page 8-22)).

5.) Return and fasten the two Phillips screws previously removed from either side of the securing panel (refer to Figure 8-237 on page 8-207). Make sure the DVD /CD-RW Drive is firmly secured in position.

6) Return the bottom rear cover, as described in the "Bottom Rear Cover Installation Procedure" on page 8-21.

7) Return the Vivid S5 N or Vivid S6 N front cover, as described in the "Front Cover Installation Procedure" on page 8-18.

8) Return the Vivid S5 N or Vivid S6 N left and right side covers, as described in the "Left Side Cover Installation Procedure" on page 8-7 and "Right Side Cover Installation Procedure" on page 8-5.

9.) Proceed to perform the following functionality tests:

- "Grounding Continuity" on page 10-23
- "Chassis Current Leakage Test" on page 10-24

10.) Insert a CD-R disk in the DVD /CD-RW Drive. Then eject and remove the CD-R disk to check the eject mechanism functions properly.

8-9-3 MOD Drive Replacement Procedure

NOTE: This section describes removal and replacement procedures only. For initial installation instructions, refer to the information provided in Chapter 3 - System Setup. See the MOD Drive section, page 3-23.

Figure 8-243 MOD Drive

8-9-3-1 Tools

None.

8-9-3-2 Time Required

30 mins

8-9-3-3 Preparations

Shut down the Vivid S5 N or Vivid S6 N ultrasound unit, as described in *Chapter 3* - System Setup.

8-9-3-4 MOD Drive Removal Procedure

1.) Disconnect the USB cable from the scanner rear connectors panel, and from the USB port at the rear of the MOD Drive .

2.) Disconnect the power cable from the power IN socket at rear of the MOD Drive, and from the peripheral power outlet at the rear of the scanner.

3.) Remove the MOD Drive and place on a flat surface (together with the two cables removed).

8-9-3 MOD Drive Replacement Procedure (cont'd)

8-9-3-5 MOD Drive Installation Procedure

1.) Place the MOD Drive either on the tray at the rear of the Vivid S5 N or Vivid S6 N scanner, or on a flat, stable surface close to the scanner.

2.) Using the power cable (provided with the MOD Drive), connect one end to the power IN socket at rear of the MOD Drive and the other to one of the peripheral power outlets at the rear of the scanner.

3.) Connect the USB cable between the USB port at the rear of the MOD Drive and either of the USB ports (*upper* or *lower*) on the scanner rear connectors panel.

4.) Proceed to perform the following functionality tests:

- "Grounding Continuity" on page 10-23
- "Chassis Current Leakage Test" on page 10-24

5.) Insert an MO disk in the MOD drive. Then eject and remove the MO disk to check the eject mechanism functions properly.

8-9-4 Black and White Printer Replacement Procedure

NOTE: This section describes removal and replacement procedures only. For initial installation and configuration instructions, refer to the information provided in Chapter 3 - System Setup. See "Connecting the Black & White Printer" on page 3-24 and "Configuring Printing Buttons P1 and P2" on page 3-28.

Figure 8-244 Black and White Printer

NOTE: When replacing the Black and White Printer, make sure the correct cover kit has been ordered, if applicable. Refer to for details.

8-9-4-1 Tools

Use the appropriate screwdrivers as indicated in the Black and White Printer replacement procedure.

8-9-4-2 Time Required

30 minutes

8-9-4-3 Preparations

Shut down the Vivid S5 N or Vivid S6 N ultrasound unit, as described in *Chapter 3* - System Setup.

8-9-4-4 Black and White Printer Removal Procedure

1) Remove the Vivid S5 N or Vivid S6 N left and right side covers, as described in the "Left Side Cover Removal Procedure" on page 8-6 and "Right Side Cover Removal Procedure" on page 8-5.
2) Remove the Vivid S5 N or Vivid S6 N front cover, as described in the "Front Cover Removal Procedure" on page 8-16.
3) Remove the bottom rear cover, as described in the "Bottom Rear Cover Removal Procedure" on page 8-21.
4.) Loosen and remove the two lower Phillips screws on either side of the securing panel (that holds the Black and White Printer in position), as indicated in Figure 8-245 on page 8-214.

8-9-4 Black and White Printer Replacement Procedure (cont'd)

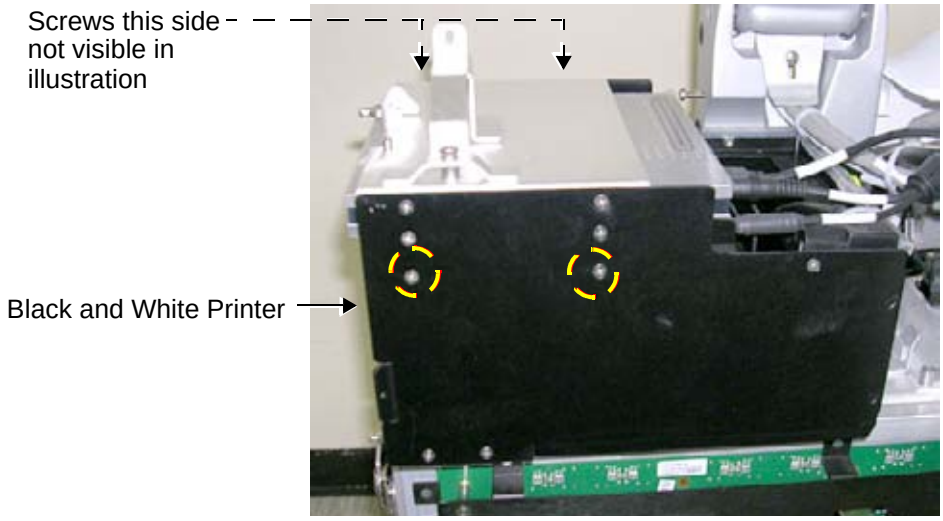


Figure 8-245 Screws Securing Black and White Printer in Compartment

5.) Using a small screwdriver, release the metal securing plate and slide it out of the compartment, as shown in Figure 8-246 below.

Figure 8-246 Removing the Securing Plate

6.) Disconnect the USB cable and the power cable from the rear of the Black and White Printer, as shown in Figure 8-247.

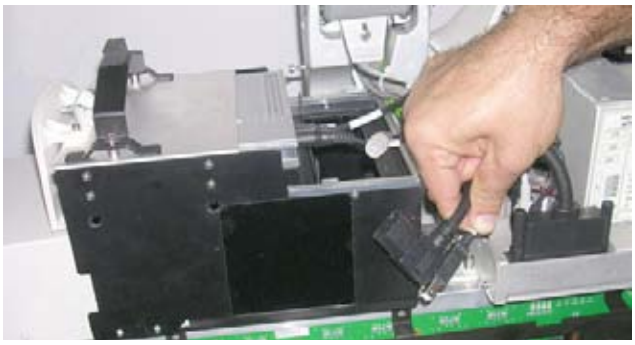


Figure 8-247 Cables Disconnected from Rear of Black and White Printer

7.) Carefully push the Black and White Printer out of the compartment, while holding it firmly to prevent it from falling.

8.) Remove the printer and place it on a flat, stable surface.

8-9-4-5 Black and White Printer Installation Procedure

1.) Carefully place the replacement Black and White Printer into the compartment. Slide it all the way in, making sure it is properly seated against the rear of the compartment.

2.) Re-connect the USB cable and the power cable to the rear of the printer - refer to , as indicated in Figure 8-247 on page 8-214.

3.) Return the metal securing plate (previously removed) and slide it all the way into position - refer to Figure 8-246 on page 8-214. (If necessary, lift the printer slightly to facilitate entrance of the securing plate into the compartment).

4.) Return and fasten the two lower Phillips screws previously removed from either side of the securing panel (refer to Figure 8-245 on page 8-214). Make sure the printer is firmly secured in position.

5) Return the bottom rear cover, as described in the "Bottom Rear Cover Installation Procedure" on page 8-21.

6) Return the Vivid S5 N or Vivid S6 N front cover, as described in the "Front Cover Installation Procedure" on page 8-18.

7) Return the Vivid S5 N or Vivid S6 N left and right side covers, as described in the "Left Side Cover Installation Procedure" on page 8-7 and "Right Side Cover Installation Procedure" on page 8-5.

8.) Proceed to perform the following functionality tests:

- "Grounding Continuity" on page 10-23
- "Chassis Current Leakage Test" on page 10-24
- "B/W and Color Printer Test" on page 4-32

8-9-5 Peripherals Console Replacement Procedure

8-9-5-1 Tools

Use the appropriate screwdrivers as indicated in the Peripherals Console replacement procedure.

8-9-5-2 Time Required

30 minutes

8-9-5-3 Preparations

Shut down the Vivid S5 N or Vivid S6 N ultrasound unit, as described in *Chapter 3 -* .

8-9-5-4 Peripherals Console Removal Procedure

1) Remove the Vivid S5 N or Vivid S6 N left and right side covers, as described in the “Left Side Cover Removal Procedure” on page 8-6 and “Right Side Cover Removal Procedure” on page 8-5.
2) Remove the Vivid S5 N or Vivid S6 N front cover, as described in the “Front Cover Removal Procedure” on page 8-16.
3) Remove the Vivid S5 N or Vivid S6 N left and right rear covers, as described in the “Left Rear Cover Removal Procedure” on page 8-13 and “Right Rear Cover Removal Procedure” on page 8-10
4) Remove the DVD/CD-RW drive, as described in the “DVD/CD-RW Drive Removal Procedure” on page 8-207.
5) Remove the B&W printer, as described in the “Black and White Printer Removal Procedure” on page 8-213.
6) Loosen the 4 retaining screws that secure the peripherals console in position, as shown in Figure 8-248.

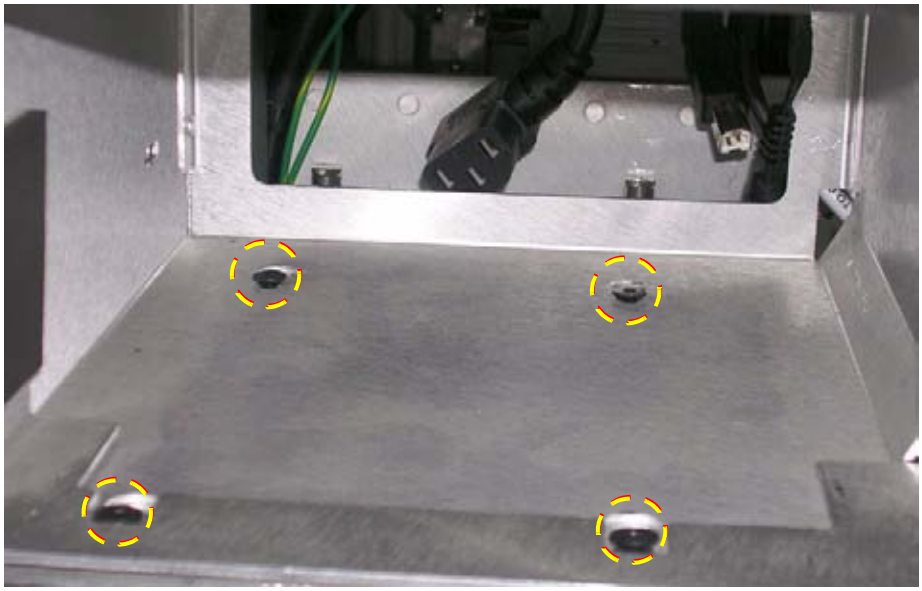


Figure 8-248 Location of Retaining Screws

7. Gently slide the peripherals console forward, lift it slightly and then remove it.

8-9-5-5 Peripherals Console Installation Procedure

1. Remove the DVD/CD-RW drive securing bracket from the new peripherals console (P/N S2418522), as shown in Figure 8-249.

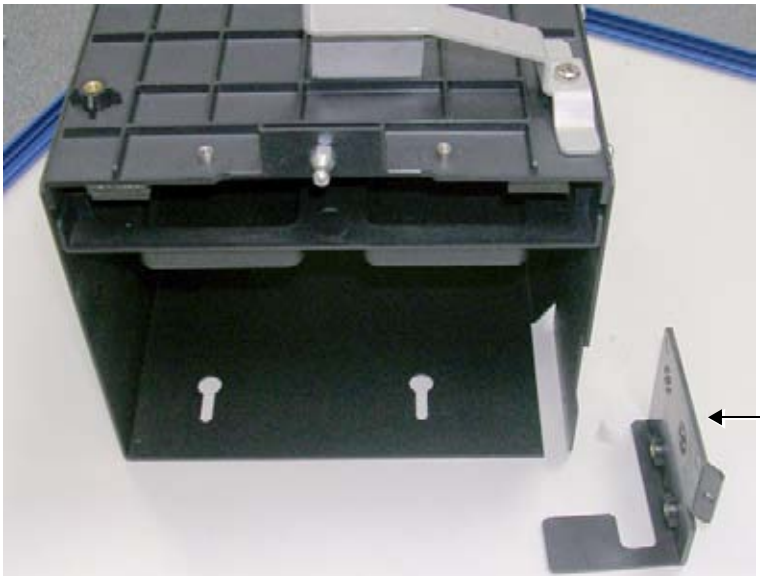


Figure 8-249 New Peripherals Console with DVD/CD-RW Drive Securing Bracket

2. Place the new peripherals console in its position on the Vivid S5/S6 system and tighten the securing screws (previously released) - refer to Figure 8-248.

Note: The new peripherals console is supplied with two additional gaskets, which insulate the B&W printer and hold the printer securely in the peripheral console. The gaskets are adhered to either side of the printer as shown in Figure 8-250.

(Second gasket on opposite side not visible in picture)
Existing front gaskets - installed on either side of printer
Air vents
Black and white printer
Additional gasket adhered to printer adjacent rear securing screw

Figure 8-250 B&W Printer showing the Additional Gasket Adhered

NOTE: The existing front gaskets are in place to close the gap between the front cover and the printer.

3) Adhere each gasket adjacent to the rear screw on both sides of the printer as shown in Figure 8-250. Ensure that the vent holes are not covered by the gasket.

4) Re-install the B&W printer, as described in the “Black and White Printer Removal Procedure” on page 8-213.

5) Re-install the DVD/CD-RW drive, as described in the “DVD/CD-RW Installation Procedure” on page 8-209.

6) Return the Vivid S5 N or Vivid S6 N left and right rear covers, as described in the “Left Rear Cover Installation Procedure” on page 8-15 and “Right Rear Cover Installation Procedure” on page 8-12

7) Return the Vivid S5 N or Vivid S6 N front cover, as described in the “Front Cover Installation Procedure” on page 8-18.

8) Return the Vivid S5 N or Vivid S6 N left and right side covers, as described in the “Left Side Cover Installation Procedure” on page 8-7 and “Right Side Cover Installation Procedure” on page 8-5.

9.) Turn ON power to the system.

10.) Proceed to perform the following functionality tests:

- “Grounding Continuity” on page 10-23
- “Chassis Current Leakage Test” on page 10-24

8-9-6 Digital Color Printer Replacement Procedure

NOTE: This section describes removal and replacement procedures only. For initial installation and configuration instructions, refer to the information provided in Chapter 3 - System Setup. See "Connecting the Digital Color Printer" on page 3-27 and "Configuring Printing Buttons P1 and P2" on page 3-28.

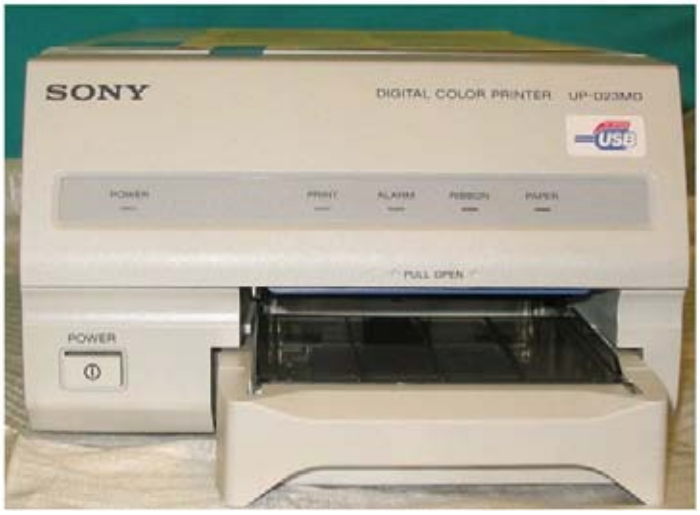


Figure 8-251 Digital Color Printer

8-9-6-1 Tools

None

8-9-6-2 Time Required

20 minutes

8-9-6-3 Preparations

Shut down the Vivid S5 N or Vivid S6 N ultrasound unit, as described in *Chapter 3 - System Setup*.

8-9-6-4 Digital Color Printer Removal Procedure

1.) Disconnect the USB cable from the scanner rear connectors panel, and from the USB port at the rear of the printer.
2.) Disconnect the power cable from the power IN socket at rear of the printer, and from the printer peripherals outlet at the rear of the scanner.
3.) Remove the printer and place on a flat surface (together with the two cables removed).

8-9-6-5 Digital Color Printer Installation Procedure

1.) Place the Digital Color Printer on a stable surface close to the Vivid S5 N or Vivid S6 N scanner.
2.) Using the power cable (provided with the printer), connect one end of the power cable to the power IN socket at rear of the printer, and the other end to the printer peripherals outlet at the rear of the scanner.
3.) Connect the USB cable between the USB port at the rear of the printer and either of the USB ports (*upper* or *lower*) on the scanner rear connectors panel.

8-9-6 Digital Color Printer Replacement Procedure (cont'd)

NOTE: For configuration instructions, see "Configuring Printing Buttons P1 and P2" on page 3-28.

4.) Proceed to perform the following functionality tests:

- "Grounding Continuity" on page 10-23
- "Chassis Current Leakage Test" on page 10-24
- "Color Printer Test" on page 4-32

8-9-7 DeskJet Color Printer Replacement Procedure

NOTE: This section describes removal and replacement procedures only. For initial installation and configuration instructions, refer to the information provided in Chapter 3 - System Setup3-1. See 3-5-1-8 "Connecting the DeskJet Color Printer" on page 3-39 and 3-5-1-8-2 "Setting the HP Office Pro K5400 as the Default Report Printer" on page 3-44.

Figure 8-252 DeskJet Color Printer

8-9-7-1 Tools

None

8-9-7-2 Time Required

20 minutes

8-9-7-3 Preparations

Shut down the Vivid S5 N or Vivid S6 N ultrasound unit, as described in *Chapter 3* - System Setup.

8-9-7-4 DeskJet Color Printer Removal Procedure

1.) Disconnect the USB cable from the scanner rear connectors panel, and from the USB port at the rear of the printer (Figure 8-253 on page 8-222) .

2.) Disconnect the power cable (and AC adaptor) from the power IN socket at rear of the printer (Figure 8-253), and from the printer peripherals outlet at the rear of the scanner.

3.) Remove the printer and place on a flat surface (together with the two cables removed).

8-9-7 DeskJet Color Printer Replacement Procedure (cont'd)

8-9-7-5 DeskJet Color Printer Installation Procedure

WARNING ***Do not attempt to use a different type of DeskJet Color Printer (brand or model) other than the DeskJet Color Printer provided by GE HEALTHCARE. The ultrasound system is an extremely sensitive and complex medical system. Any unauthorized peripherals may cause system failure or damage!***

1.) Place the DeskJet Color Printer on a stable surface close to the Vivid S5 N or Vivid S6 N scanner.

2.) Using the AC adaptor and power cable (provided with the printer), connect one end of the power cable to the power IN socket at rear of the printer (Figure 8-253), and the other to the printer peripherals outlet at the rear of the scanner.

Figure 8-253 DeskJet Color Printer - Rear View

3.) Connect the USB cable between the USB port at the rear of the printer (Figure 8-253) and either of the USB ports (*upper* or *lower*) on the scanner rear connectors panel.

NOTE: *For configuration instructions, see 3-5-1-8-2 "Setting the HP Office Pro K5400 as the Default Report Printer" on page 3-44.*

4.) Proceed to perform the following functionality tests:

- "Grounding Continuity" on page 10-23
- "Chassis Current Leakage Test" on page 10-24
- "Color Printer Test" on page 4-32

Chapter 9
Renewal Parts

Section 9-1
Overview

9-1-1 Purpose of Chapter 9

This chapter gives you an overview of replacement parts for the Vivid S5 N and Vivid S6 N ultrasound scanner.

Table 9-1 Contents in Chapter 9

Section	Description	Page Number
9-1	Overview	9-1
9-2	List of Abbreviations	9-2
9-3	Renewal Parts Lists and Diagrams	9-3
9-4	Peripherals	9-18

Section 9-2
List of Abbreviations

- **Assy** - Assembly
- **BEP** - Back End Processor
- **CRU** - Customer Replaceable Unit
- **Ctrl** - Control
- **FEP** - Front End Processor
- **FRU Y** - Replacement part
- **FRU N** - Non Stock Part
- **LCD** - Liquid Crystal Display
- **Int** - Internal
- **I/O** - Input/Output
- **PWA** - Printed Wire Assembly
- **Recv** - Receive
- **XFRMR** - Transformer

Section 9-3
Renewal Parts Lists and Diagrams

9-3-1 Covers

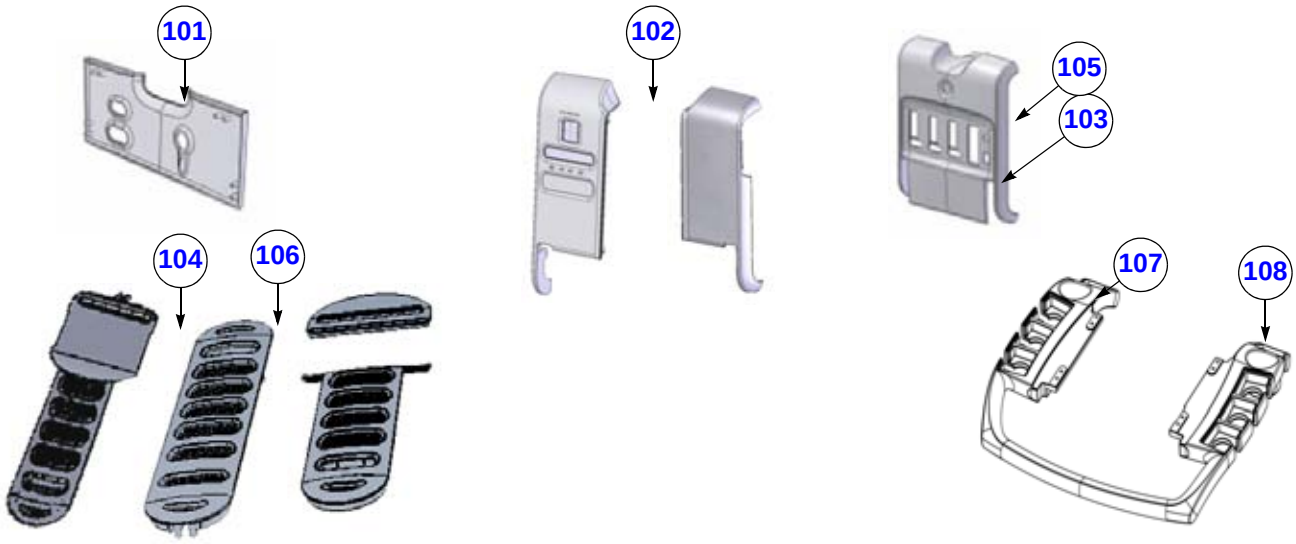


Figure 9-1 Covers - Diagram 1

Table 9-2 Covers - Diagram 1

Item	Part Name	Part Number	Description	S5	S6	Qty	CRU	FRU
101	Cover: Bottom rear.	S2420948		✔	✔	1	N	Y
102	Cover: Rear left + Rear right	S2421610		✔	✔	1	N	Y
103	Cover: VS5 front	S2420817		✔		1	N	Y
104	Cover: VS5 left + right + DVD (kit)	S2421611	Includes Air Filter	✔		1	N	Y
105	Cover: VS6 front	S2420993			✔	1	N	Y
106	Cover: VS6 left + right + DVD (kit)	S2421612	Includes Air Filter		✔	1	N	Y
107	Probe Shelf - VS6	S2421613			✔	1	N	Y
108	Probe Shelf - VS5	S2421614		✔		1	N	Y

9-3-1 Covers (cont'd)

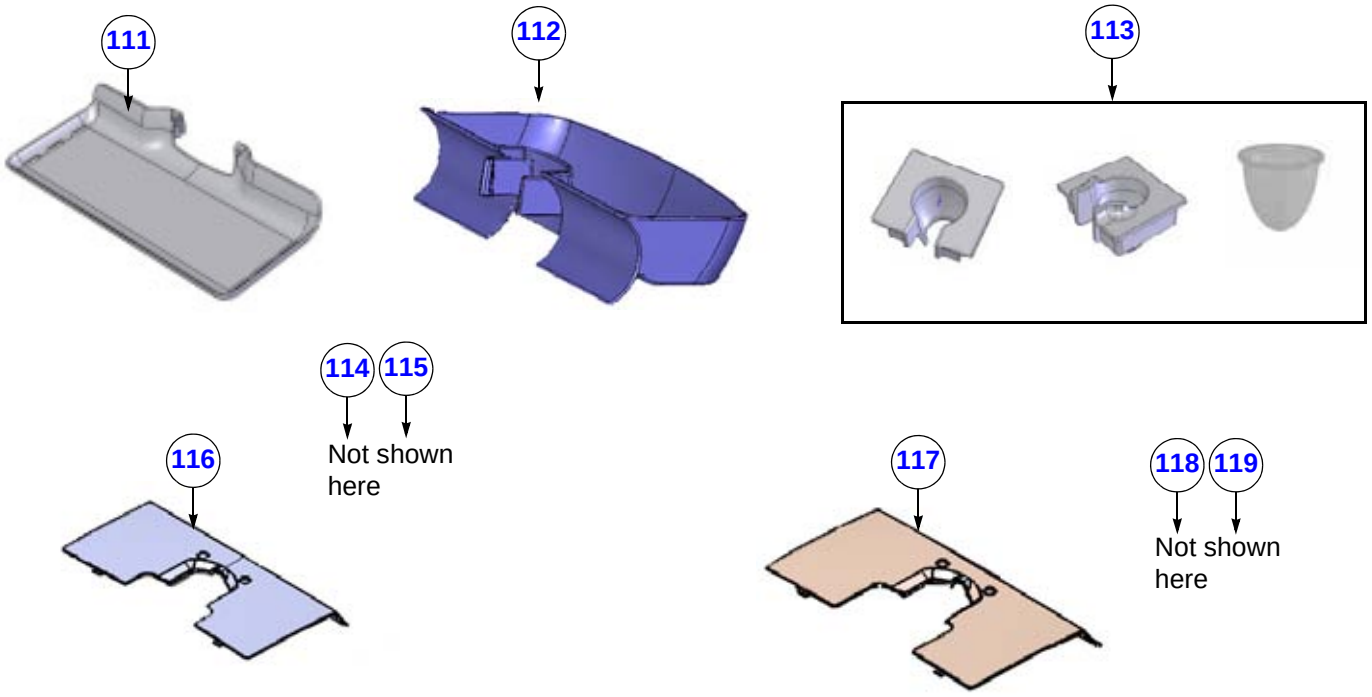


Figure 9-2 Covers - Diagram 2

Table 9-3 Covers - Diagram 2

Item	Part Name	Part Number	Description	S5	S6	Qty	CRU	FRU
111	Printer Shelf	S2420939		✔	✔	1	N	Y
112	Basket	S2420940		✔	✔	1	N	Y
113	Probe Inserts and Gel cups	S2421616		✔	✔	4	N	Y
114	Key Cap Kit	S2421617		✔	✔	1	Y	Y
115	Cover: KB Upper and Lower Cover	S2421624		✔	✔	1	N	Y
116	Cover: VS5 Monitor 15" Arm Kit	S2421626		✔		1	N	Y
117	Cover: VS6 Monitor 17" Arm Kit	S2421627			✔	1	N	Y
118	Cover: VS5 Monitor 15" Front and Rear Kit	S2421628		✔		1	N	Y
119	Cover: VS6 Monitor 17" Front and Rear Kit	S2421629			✔	1	N	Y

9-3-2 Mechanical Hardware Parts

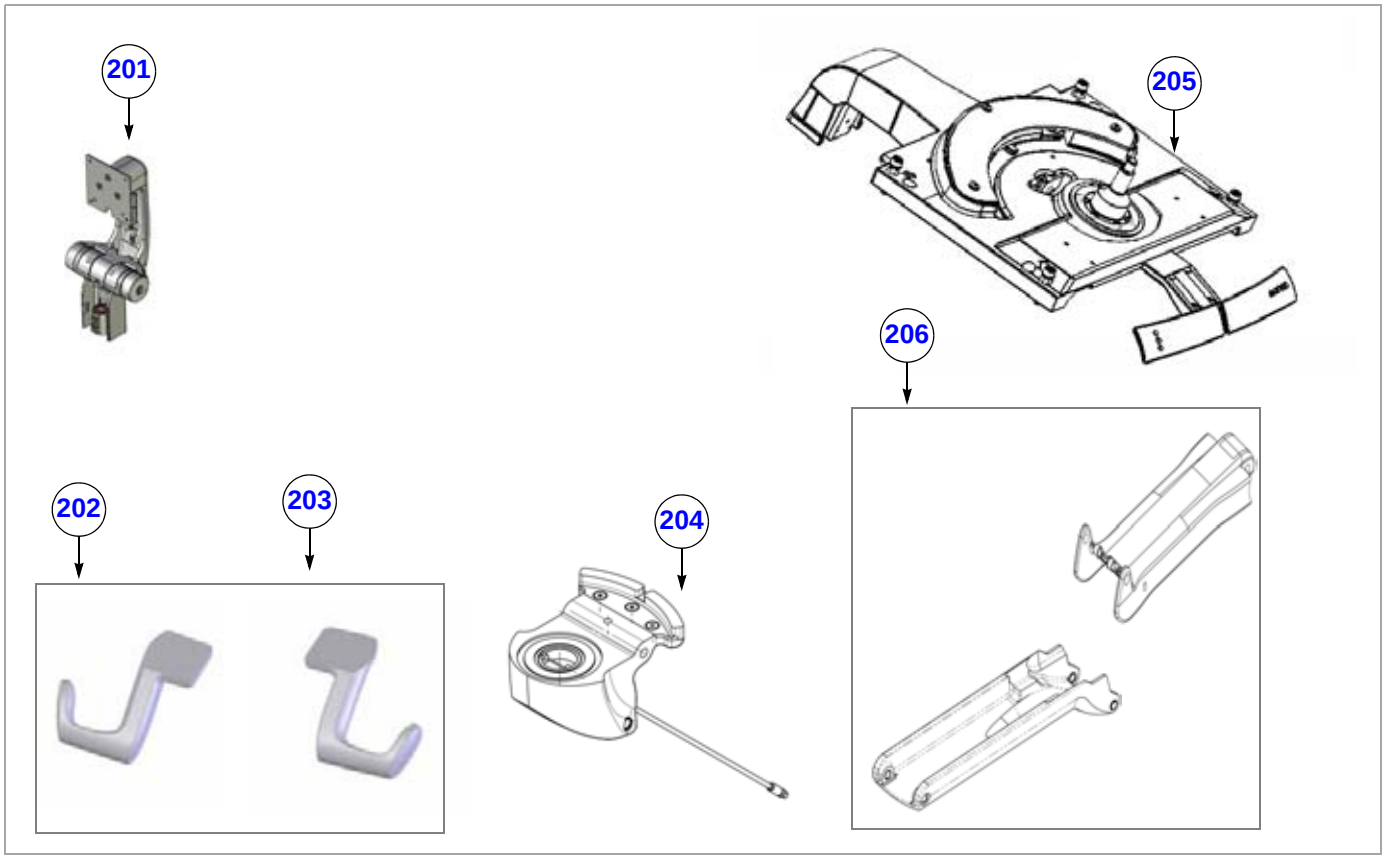


Figure 9-3 Mechanical Hardware Parts - Diagram 1

Table 9-4 Mechanical Hardware Parts - Diagram 1

Item	Part Name	Part Number	Description	S5	S6	Qty	CRU	FRU
201	Monitor 15"/17" Arm Assy.	S2418523		✔	✔	1	N	Y
202	VS5 Cable Holder Right Left	S2421631		✔		1	N	Y
203	VS6 Cable Holder Right Left	S2421632			✔	1	N	Y
204	Joint Assy.	S2420695		✔	✔	1	N	Y
205	KB Interface assy	S2419074		✔	✔		N	Y
206	Upper and Lower Arm Assy Kit	S2421633		✔	✔		N	Y

9-3-2 Mechanical Hardware Parts (cont'd)

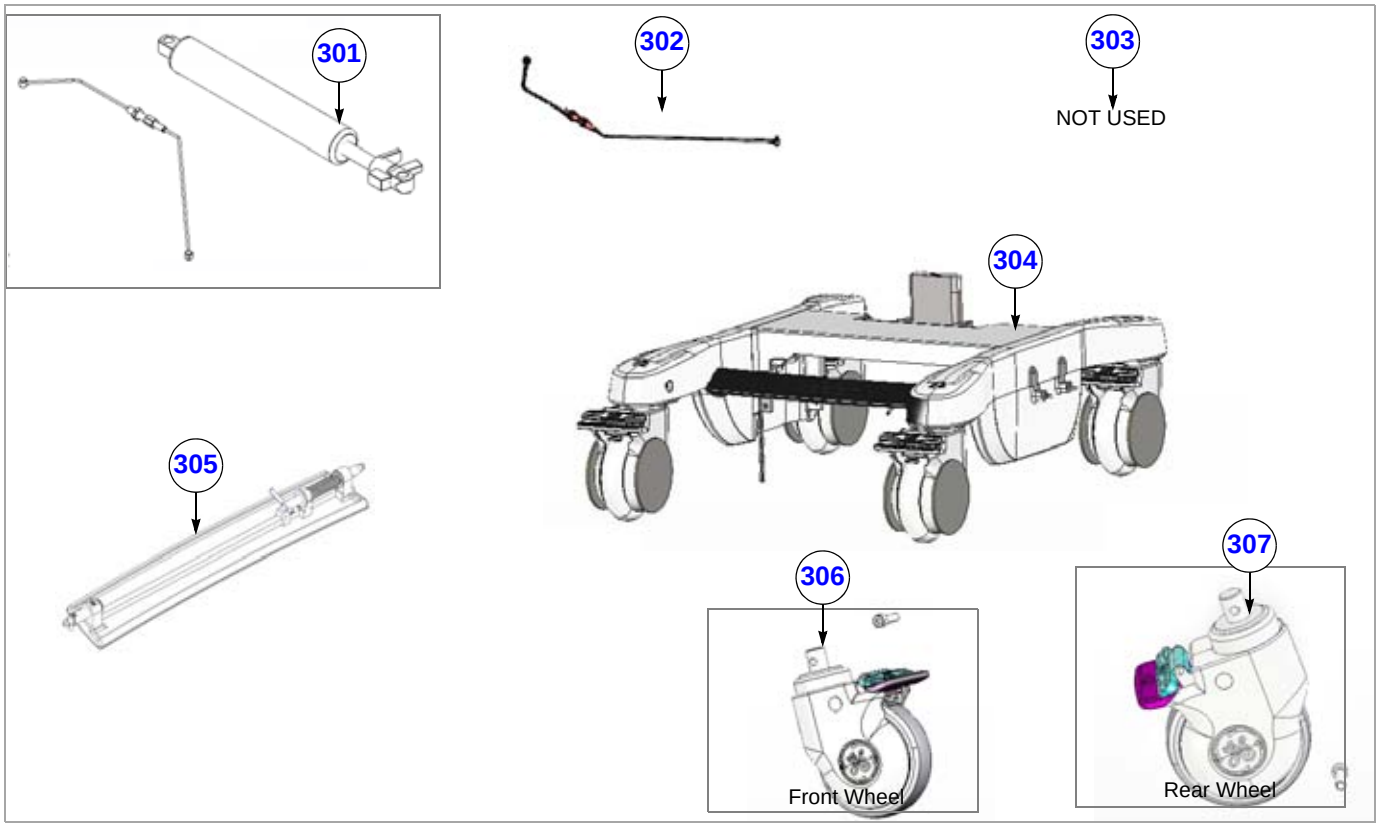


Figure 9-4 Mechanical Hardware Parts - Diagram 2

Table 9-5 Mechanical Hardware Parts - Diagram 2

Item	Part Name	Part Number	Description	S5	S6	Qty	CRU	FRU
301	Gas Spring	S2420891		✔	✔	1	N	Y
302	Gas Spring Cable	S2420834		✔	✔	1	N	Y
303	NOT USED	-		-	-	-	-	-
304	Base Console Assy.	S2421634		✔	✔	1	N	Y
305	Foot Rest Assy VS5N/VS6N.	S2420478		✔	✔	1	N	Y
306	Wheel: Brake Locking	S2420671	Front Wheel	✔	✔	2	N	Y
307	Wheel: Swivel Locking	S2420672	Rear Wheel	✔	✔	2	N	Y

9-3-3 Electro Mechanical Parts

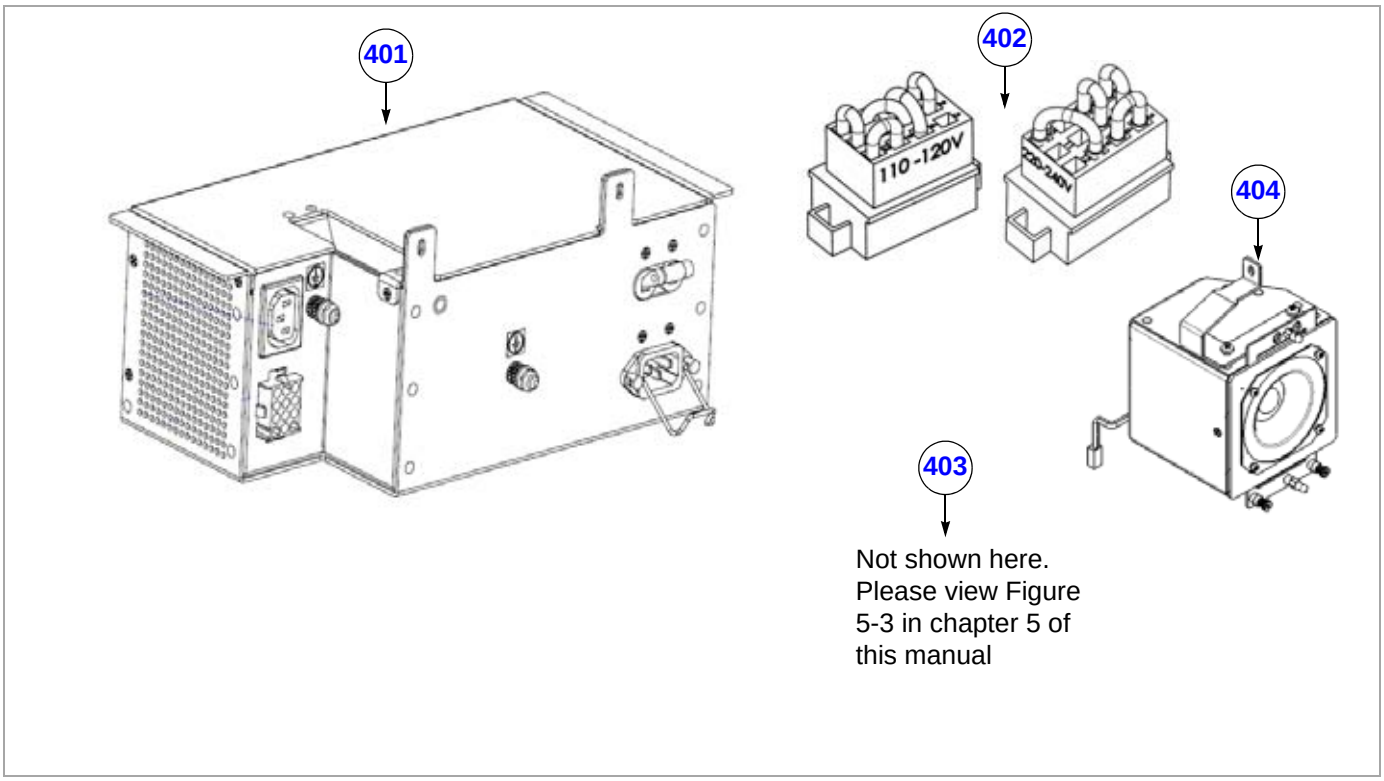


Figure 9-5 Electro Mechanical Parts - Diagram 1

Table 9-6 Electronic Parts - Diagram 1

Item	Part Name	Part Number	Description	S5	S6	Qty	CRU	FRU
401	AC Box Payton Service Kit	S2421900		✔	✔	1	N	Y
402	AC Power Jumpers Set. 100-120V & 220-240V	S2420132-2		✔	✔	1	N	Y
403	Fan board.	N2418518-3		✔	✔	1	N	Y
404	Sub Woofer	S2418526		✔	✔	1	N	Y

9-3-4 Electronic Parts

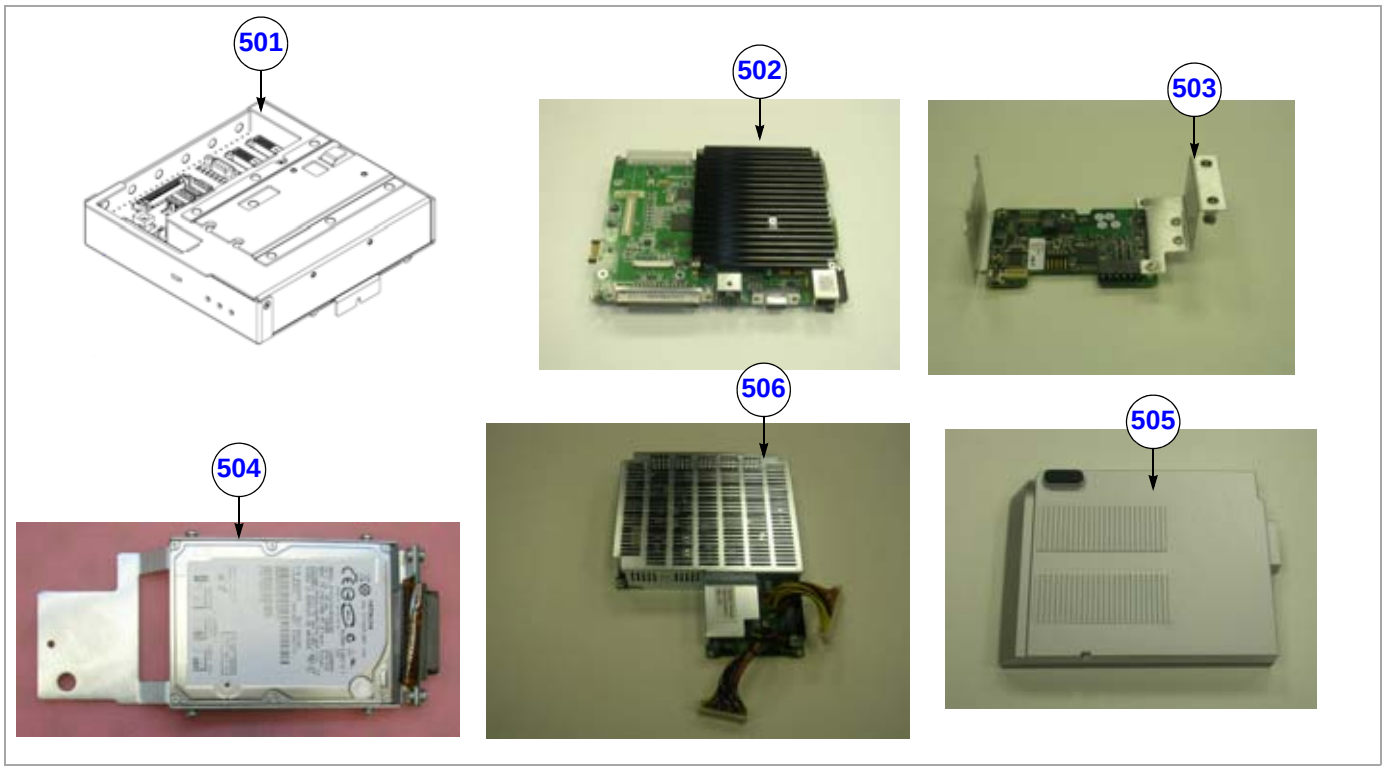


Figure 9-6 Electronic Parts - Diagram 1

Table 9-7 Electronic Parts - Diagram 1

Item	Part Name	Part Number	Description	S5	S6	Qty	CRU	FRU
501	Distribution Module (DIB)	S2419681-4		✔	✔	1	N	Y
502	BEP Service Kit	S2422395		✔	✔	1	N	Y
503	ECG Board Rev3	N2419018-3		✔	✔	1	N	Y
504	Hard Disk Module w/o SW	S2376515		✔	✔	1	N	Y
505	Internal Battery Pack	S2378963-3		✔	✔	1	N	Y
506	DC/DC Module	S2403248-4		✔	✔	1	N	Y

9-3-4 Electronic Parts (cont'd)

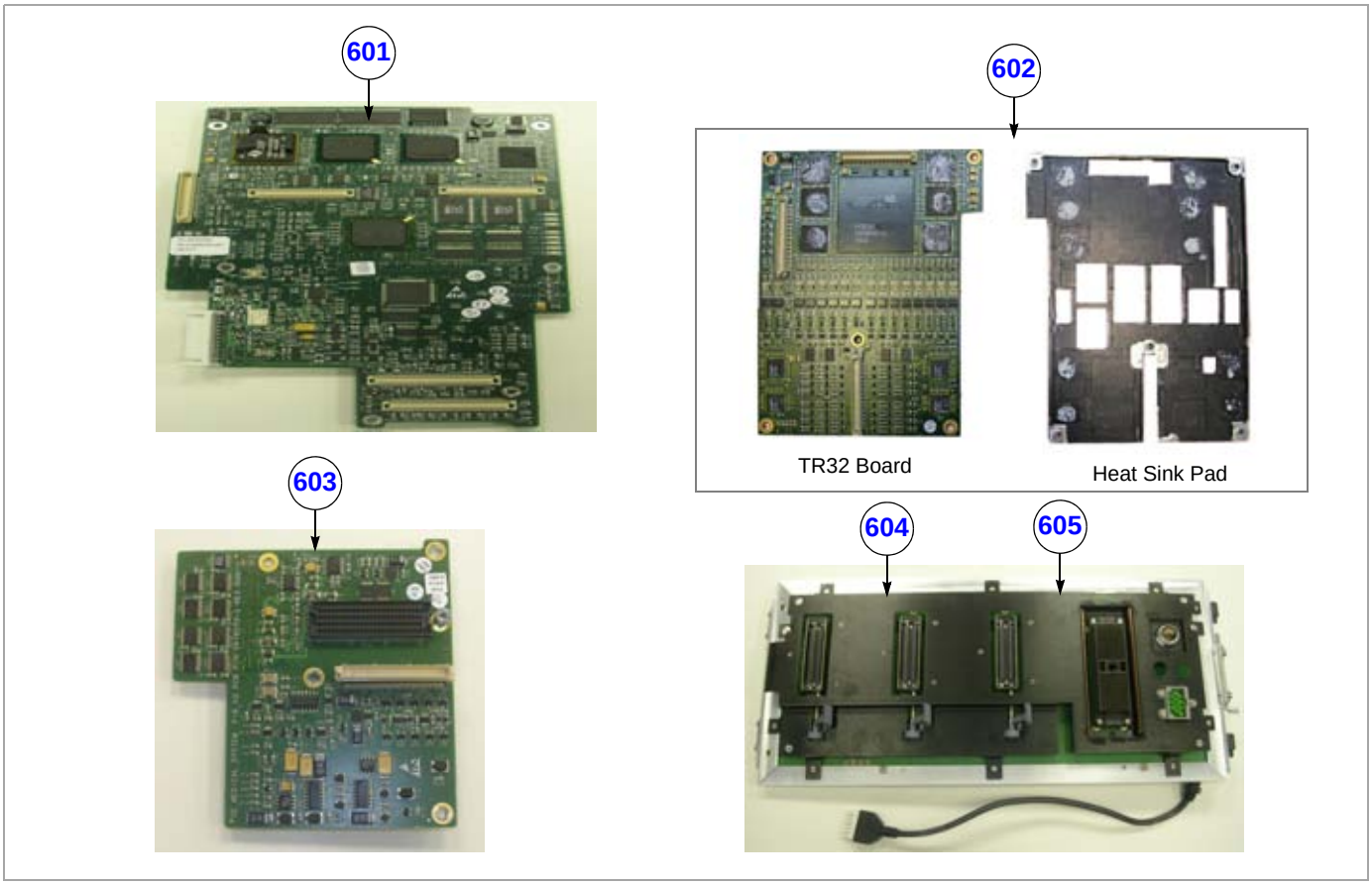


Figure 9-7 Electronic Parts - Diagram 2

Table 9-8 Electronic Parts - Diagram 2

Item	Part Name	Part Number	Description	S5	S6	Qty	CRU	FRU
601	RFI Board AM	N2418295-2		✔	✔	1	N	Y
602	TR32 Board	N2354258-7	Complete with Heat Sink Pad	✔	✔	2	N	Y
603	PI Board	N2418272-3		✔	✔	1	N	Y
604	PS Board VS5N	N2418592-5		✔		1	N	Y
605	PS Board VS6N	N2418592-6			✔	1	N	Y

9-3-4 Electronic Parts (cont'd)

Figure 9-8 Electronic Parts - Diagram 3

Table 9-9 Electronic Parts - Diagram 3

Item	Part Name	Part Number	Description	S5	S6	Qty	CRU	FRU
701	VS5 Monitor 15"	S2418525		✔		1	N	Y
702	VS6 Monitor 17"	S2418525-2			✔	1	N	Y
703	Operator panel (keyboard)	FN200014	Contains Product label	✔	✔	1	N	Y
704	KB A/N Keyboard	S2421618		✔	✔	1	N	Y
705	KB Trackball	S2421619		✔	✔	1	N	Y
706	KB TGC Slides	S2421620		✔	✔	1	N	Y
707	KB Soft keys board+ light sensors	S2421621		✔	✔	1	N	Y
708	KB Extended keys board	S2421622		✔	✔	1	N	Y
709	KB Speaker	S2421623		✔	✔	1	N	Y
710	Trackball Ring	S2421625		✔	✔	1	N	Y

9-3-5 Cables

Table 9-10 Cables

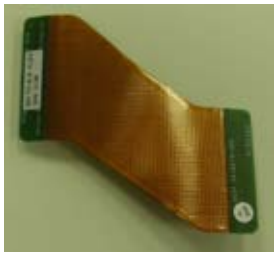
Item	Part Name	Part Number	Description	Qty	CRU	FRU
1001	Cable: RFI to BEP flex	S2418578		1	N	Y
1002	Cable: BEP to Bridge	S2420879		1	N	Y
1003	Cable: Bridge USB BEP to Distribution	S2420816			N	Y
1004	Cable: PIB to PSB flex	S2418220-2		1	N	Y
1005	Cable: Ac Box to Distribution	S2419539		1	N	Y

Table 9-10 Cables (cont'd)

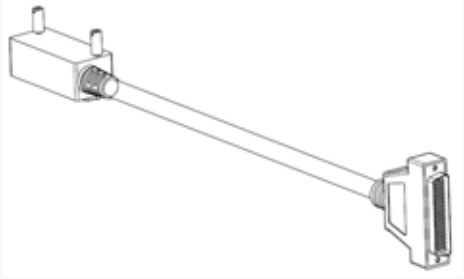
Item	Part Name	Part Number	Description	Qty	CRU	FRU
1006	Cable: B&W Printer USB to Distribution	S2419132		1	N	Y
1007	Cable: BEP LAN to DIB	S2419055		1	N	Y
1008	Cable: BEP to Battery	S2418962		1	N	Y
1009	Cable: DVD Power to Distribution	S2419174		1	N	Y
!010	Cable: Interface BEP to Distribution	S2419125		1	N	Y

Table 9-10 Cables (cont'd)

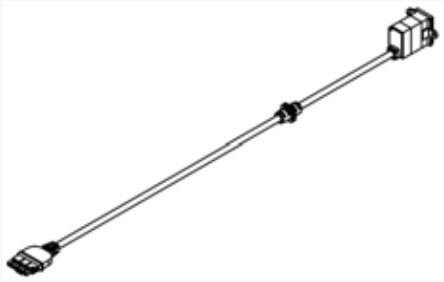
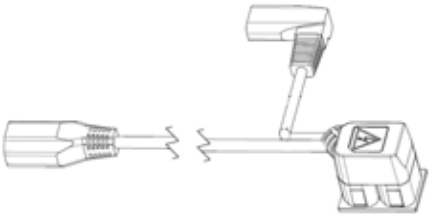
Item	Part Name	Part Number	Description	Qty	CRU	FRU
1011	Cable: Internal ECG	S2419034-2		1	N	Y
1012	Cable: KB Data to Distribution	S2419653		1	N	Y
1013	Cable: Monitor DVI to Distribution	S2419175		1	N	Y
1014	Cable: DVD USB to Distribution	S2419131		1	N	Y
1015	SOLERS CABLE+AC OUTLET BRACKET KIT	S2424478		1	N	Y
1016	Cable: Power Monitor to Distribution	S2419177		1	N	Y
1017	Cable: USB Keyboard to Distribution	S2420815		1	N	Y
1118	Cable: Main ECG Europe & ROW	S2269980		1	N	Y

Table 9-10 Cables (cont'd)

Item	Part Name	Part Number	Description	Qty	CRU	FRU
1119	Cable: Yellow Lead Europe & ROW	S2269983		1	N	Y
1120	Cable: Black Lead Europe & ROW	S2269983-2		1	N	Y
1121	Cable: Red Lead Europe & ROW	S2269983-3		1	N	Y

9-3-6 Software

Table 9-11 Software

Item	Part Name	Part Number	Description	Qty	CRU	FRU
1301	SW DVD for Vivid S5/S6 N System SW Ver. 3.0.10 & Application SW 10.1.0 build 65	FN200045	Vivid S5N and Vivid S6 N Software	1	N	Y
1302	SW Patch. System SW Ver. 3.0.10 & Application SW 10.1.1 Build 101	FN200046	Software Patch	1	N	Y
1303	Vivid S5/S6 N Appl sw v. 7.2.0 b.100 & Sys. Sw v.2.0.8	FN200030-01	Vivid S5N and Vivid S6 N Software	1	N	Y

9-3-7 Probes

Table 9-12 Probes 1 of 2

Item	Part Name	Part Number	Description	Qty	CRU	FRU
1471	Probe: 3S - RS	2355686 H4000PD		1	Y	Y
1472	Probe: M4S-RS	H40452LH	For Vivid S6 N only	1	Y	Y
1473	Probe: 5S - RS	5135960		1	Y	Y
1474	Probe: 6S - RS	5198571 H45021RP		1	Y	Y
1475	Probe: 7S - RS	2377059 H4000PE		1	Y	Y
1476	Probe: 10S - RS	2377040 H4000PF		1	Y	Y
1477	Probe: 6T - RS	KN100093 H45531MZ	For Vivid S6 N only Must have TEE Probe Interface Module (H45551WR)	1	N	Y
1478	Probe: 6TC - RS	KN100104 H45551ZE		1	N	Y
1479	Probe: 9T - RS	KN100073 H45531YM	For Vivid S6 N only	1	N	Y
1480	Probe: 6T	KN100092 H45521DX	For Vivid S6 N only	1	N	Y
1481	Probe: 9T	KN100072 H45521DY	For Vivid S6 N only	1	Y	Y
1482	Probe:P2D	TE100024 H4830JE		1	Y	Y
1483	Probe: P6D	TQ100002 H4830JG		1	Y	Y
1484	Probe: 8L RS	2376127 H40402LT		1	Y	Y
1485	Probe: 9L RS	5270511 H40442LL		1	Y	Y
1486	Probe: 12L - RS	5154514 H40402LY		1	Y	Y
1487	Probe: 4C - RS	5131629 H4000SR		1	Y	Y
1488	Probe: 8C - RS	2354971 H4040LS		1	Y	Y
1489	Probe: e8C - RS	2290777 H40402LN		1	Y	Y
1490	Probe: i12L RS	5116678 H40402LW		1	Y	Y

Table 9-12 Probes (cont'd) 2 of 2

Item	Part Name	Part Number	Description	Qty	CRU	FRU
1491	RS PROBE GUIDE & LOCKER KIT	S2422766		1	Y	Y
1492	3S - RS Biopsy Kit	E8385MZ		1	Y	Y
1493	4C - RS Biopsy Kit	E8385NA		1	Y	Y
1494	8L - RS Biopsy Kit	E8385N		1	Y	Y
	12L - RS Biopsy Kit	40432LC		1	Y	Y

Section 9-4
Peripherals

Table 9-13 Approved Peripherals

Item	Part Name	Part Number	Description	Qty	CRU	FRU
1501	DVD/CD-RW	S2423870		1	N	Y
1502	Digital B/W Video Printer (Sony UP-D897MD)	066E0111		1	N	Y
1503	Digital Color Video Printer (Sony UP-D23MD)	H45021FG 066E2958		1	N	Y
1504	MO Drive 5.2 GB 5.25" Ext	066E0675		1	N	Y
1505	HP Color LaserJet CP2025n Printer 220-240V	H45541MJ 066E0428		1	N	Y
1506	USB Flash Card	H45551XT S2411544		1	N	Y
1507	USB-to-SCSI Converter	2422175		1	N	Y
1508	Wireless Network Interface USB	S2421636		1	N	Y

Chapter 10
Care and Maintenance

Section 10-1
Overview

10-1-1 Periodic Maintenance Inspections

Having been determined by GE Healthcare engineers that your Vivid S5 N or Vivid S6 N system has no high-wearing components likely to fail due to frequent use, no Periodic Maintenance Inspections are mandatory. However, some Customer Quality Assurance Programs may require additional tasks and/or inspections to be performed at periods of frequency different from those listed in this manual.

10-1-2 Purpose of Chapter 10

This chapter describes the Care and Maintenance (PM) procedures for the Vivid S5 N and Vivid S6 N ultrasound scanner and its peripherals. These procedures are designed to protect your investment in the Vivid S5 N or Vivid S6 N system, and are intended to **maintain the quality** of system performance.

After delivery and installation of the Vivid S5 N or Vivid S6 N ultrasound unit, your service representative will contact you to schedule the first of several routine service visits. In addition to routine maintenance by trained Field Service Engineers (FSEs), it is recommended that the procedures described in this chapter be observed as part of your own internal routine maintenance program.

Table 10-1 Contents in Chapter 10

Section	Description	Page Number
10-1	Overview	10-1
10-2	Why Perform Maintenance Procedures?	10-3
10-3	Maintenance Task Schedule	10-4
10-4	System Maintenance	10-7
10-5	Probe Maintenance	10-15
10-6	Electrical Safety Tests	10-20
10-7	Excessive Current Leakage	10-32
10-8	Vivid S5 N and Vivid S6 N Inspection Certificates	10-33

10-1-3 Warnings

DANGER **There are several places inside the cage, the battery, the AC distribution box, and the Distribution Interface Board (DIB) that could be dangerous. Be sure to disconnect the system power plug and to turn OFF the main circuit breaker before you remove any parts. Proceed with caution whenever power is ON and covers are removed.**

DANGER **Do not pull out or insert circuit boards while mains power to the system is ON.**

CAUTION **Practice good ESD prevention. Wear an anti-static strap when handling electronic parts and when disconnecting/connecting cables.**

CAUTION **Do NOT operate the unit unless all board covers and frame panels are securely in place, to ensure optimal system performance and cooling.**
When covers are removed, EMI may be present.

Section 10-2
Why Perform Maintenance Procedures?

10-2-1 Keeping Records

It is good business practice that ultrasound facilities maintain records of quality checks and corrective maintenance. The Vivid S5 N and Vivid S6 N Inspection Certificates (see page 10 - 33) provide the customer with documented confirmation that the Vivid S5 N or Vivid S6 N ultrasound scanner is maintained on a periodic basis.

Copies of the Vivid S5 N and Vivid S6 N Inspection Certificates should be kept in the same room as the Vivid S5 N or Vivid S6 N ultrasound scanner, or nearby.

10-2-2 Quality Assurance

In order to gain accreditation from organizations such as the *American College of Radiology* (*USA*), it is the customer's responsibility to have a Quality Assurance program in place for each scanner. The program must be directed by a medical physicist, the supervising radiologist/physician or appropriate designee.

Routine Quality Control testing of the system must be conducted regularly. The same tests are performed regularly during each period, so that changes can be monitored over time and effective corrective action taken, if required.

Testing results, corrective action, and the effects of corrective action, must be documented and maintained on site.

Your GE HEALTHCARE Service Representative can help you with establishing, performing and maintaining records for a Quality Assurance program. Please contact us for details of your nearest GE HEALTHCARE Service Representative, who will provide a quotation for this service, as required.

Section 10-3
Maintenance Task Schedule

10-3-1 How Often Should Care & Maintenance Procedures be Performed?

The Customer Care & Maintenance Task Schedule (provided in Table 10-2 on page 10-5) specifies how often the Vivid S5 N or Vivid S6 N ultrasound scanner should be serviced, and outlines items requiring special attention.

NOTE: It is the customer's responsibility to ensure the Care and Maintenance procedures are performed on the Vivid S5 N or Vivid S6 N ultrasound scanner as scheduled in order to retain the high levels of safety, dependability, and system performance.

Your GE HEALTHCARE Service Representative has an in-depth knowledge of your Vivid S5 N or Vivid S6 N ultrasound scanning system and can best provide competent, efficient service. Please contact us for details of your nearest GE HEALTHCARE Service Representative, and/or a quotation for services by our qualified professional FSEs.

The service procedures and recommended intervals shown in the Customer Care & Maintenance Task Schedule assumes that you use your Vivid S5 N or Vivid S6 N scanner for an average patient load (10-12 patients per day) and that you do not use it as a primary mobile unit which is transported between diagnostic facilities.

NOTE: If conditions exist which exceed typical usage and patient load, it is strongly recommended to increase the maintenance frequencies.

Table 10-2 on page 10-5 shows the Customer Care & Maintenance Task Schedule.

Make sure the following are examined on a monthly basis:

- Connectors on cables - for any mechanical defects.
- The entire length of electrical and power cables - for cuts or abrasions.
- Equipment - for loose or missing hardware.
- The keyboard - for defects.
- Brakes - for defective operation.

DANGER To avoid electrical shock hazard, do not remove the panels or covers from the machine. This servicing must be performed by qualified service personnel only. Failure to comply, could result in serious injury!

DANGER If any defects are observed or any system malfunctions occur, DO NOT operate the equipment. Inform a qualified service engineer immediately.

Table 10-2 Customer Care & Maintenance Task Schedule

Service at Indicated Time	Daily	Weekly	Monthly	Annually	Notes
Clean Probes	•				
Clean Gel Cup	•				
Clean Probe Holders	•				
Clean Air Filter			•		More frequently if necessary, depending on the environment
Inspect AC Mains Cable		*	•		*Mobile Unit Check Weekly
Inspect Cables and Connectors			•		
Clean Console		•			
Clean Monitor		•			
Clean Keyboard (KB)		•			
Clean Trackball			•		
Inspect Wheels, Casters, Brakes and Swivel Locks	*		•		* Mobile Unit Check Daily
Check Control Panel Movement	*		•		* Mobile Unit Check Daily
Console Current Leakage Checks				•	Also after corrective maintenance, or as required by your facility's QA program.
Peripheral Current Leakage Checks				•	Also after corrective maintenance, or as required by your facility's QA program.
Surface Probe Current Leakage Checks				•	Also after corrective maintenance, or as required by your facility's QA program.
Endocavity Probe Current Leakage Checks					As prescribed in the Probe Manual.
Transesphongeal (TEE) Probe Current Leakage Checks					As prescribed in Probe Manual.
Surgical Probe Current Leakage Checks					As prescribed in Probe Manual.
Measurement Accuracy Checks				•	Also after corrective maintenance, or as required by your facility's QA program.
Probe/Phantom Checks				•	Only recommended if required by your facility's QA program.
Functional Checks				•	Also after corrective maintenance, or as required by your facility's QA program.
BIOS Battery				*	It is recommended to replace the BIOS Battery once every two years.
System Battery				*	It is recommended to replace the system Battery once every two years.

10-3-2 Special Tools, Supplies and Equipment

10-3-2-1 Specific Requirements for Care & Maintenance

Table 10-3 Overview of Requirements for Care & Maintenance

Tool	Part Number	Comments
Digital Volt Meter (DVM)		
Anti Static Kit	46–194427P231 46–194427P279 46–194427P369 46–194427P373 46–194427P370	Kit includes: anti–static mat, wrist strap and cables for 220 to 240 V system 3M #2204 Large adjustable wrist strap 3M #2214 Small adjustable wrist strap 3M #3051 conductive Ground cord
Anti Static Vacuum Cleaner	46–194427P278 46–194427P279	120V 230V
Safety Analyzer	46–285652G1	DALE 600 KIT (or equivalent) for electrical tests
3.5 MOD MEDIA	E8381AA E8381AB	Blank 128 M disk Blank 230 M disk
5.25” MOD Disk Cleaning Kit (Vingmed)	066E0674	Sony MOA-D51
3.5 MOD Media Cleaner	2117811	Cleans the diskettes
5.25 MOD Media Cleaner		Cleans the diskettes
3.5 MOD Head Cleaner Kit	2148392	Cleans the drive heads
5.25 MOD Head Cleaner Kit		Cleans the drive heads
QIQ Phantom	E8370RB	RMI Grayscale Target Model 403GS
B/W Printer Cleaning Sheet		See printer User Manual for requirements
Color Printer Cleaning Sheet		See printer User Manual for requirements
Disposable Gloves		
System Service Code		Required in order to enter system diagnostics
User Manual		Current revision
Service Manual		Current revision

Section 10-4
System Maintenance

10-4-1 Preliminary Checks

The preliminary checks take approximately 15 minutes to perform. Refer to the *Vivid S5 N or Vivid S6 N User Manual* whenever necessary.

Table 10-4 System Preliminary Checks

Step	Item	Description
1	Ask & Listen	Ask the customer if they have any problems or questions about the equipment.
2	Paperwork	Fill in the appropriate details at the top of the Vivid S5 N and Vivid S6 N System Inspection Certificate (see page 10-33). Note all probes and system options.
3	Power-up	Turn the system power ON and verify that all fans and peripherals turn on. Watch the displays during power up to verify that no warning or error messages are displayed.
4	Probes	Verify that the system properly recognizes all probes.
5	Displays	Verify proper display on the monitor.
6	Presets	Back-up all customer presets on a CD-RW.

10-4-2 Functional Checks

The functional checks take approximately 60 minutes to perform. Refer to the *Vivid S5 N or Vivid S6 N User Manual* whenever necessary.

NOTE: Refer also to Chapter 4 - Functional Checks, for additional details about the functional checks described in this section.

10-4-2-1 System Checks

Table 10-5 System Functional Checks

Step	Item (or Mode)	Description
1	B-Mode	Verify basic B-Mode (2D) operation. Check the basic system controls that affect this mode of operation.
2	CF-Mode	Verify basic CF-Mode (Color Flow Mode) operation. Check the basic system controls that affect this mode of operation.
3	Doppler Modes	Verify basic Doppler operation (PW and CW if available). Check the basic system controls that affect this mode of operation.
4	M-Mode	Verify basic M-Mode operation. Check the basic system controls that affect this mode of operation.
5	Applicable Software Options[a]	Verify the basic operation of all optional modes such as Dual Focus, Virtual convex on linear probes, SRI, ATO/ASO, APRO, CPI, Compound, AMM, LOGIQ View, B-Flow/BFI, Stress Echo, TVI/TT, TSI, IMT, LVO Contrast, Vasc./Abd. Contrast, OB Package... etc. Check the basic system controls that affect the operation of each option.
6	Probe Elements	Perform an Element Test on each probe to verify that all the probe elements and system channels are functional.
7	System Diagnostics	Perform the Automatic Test to verify that all boards are functioning according to specifications.
8	Xmit/Recv Elements	Use the Visual Channel Utility on the 12L probe to verify that all system xmit/recv channels are functional.
9	Keyboard Test	Perform the Keyboard Test Procedure to verify that all keyboard controls are OK.
10	LCD Display	Verify basic LCD display functions. Refer to Chapter 3 of the Vivid S5 N or Vivid S6 N User Manual.

a. Some software may be considered as standard, depending upon system model configuration

10-4-2-2 Peripheral/Option Checks

If any peripherals or options are not part of the system configuration, the check can be omitted. Refer to the *Vivid S5 N or Vivid S6 N User Manual* for a list of approved peripherals/options.

Table 10-6 GE Approved Peripheral/Hardware Option Functional Checks

Step	Item	Description
1	B/W Printer	Verify hardcopy output of the B/W video page printer. Clean heads and covers if necessary.
2	Color Printer	Verify hardcopy output of the Color video page printer. Clean heads and covers if necessary.
3	InkJet Printer	Verify hardcopy output of the Inkjet page printer. Clean heads and covers if necessary.
4	Network Printer	Verify hardcopy output. Clean covers if necessary.
5	DICOM	Verify that DICOM is functioning properly. Send an image to a DICOM device.
7	InSite	Verify that InSite is functioning properly. Ensure two-way remote communications. (Warranty & Contract Customers only)
8	ECG	Verify basic operation with customer.
9	DVD-CDRW	Verify that the DVD-CDRW is functioning properly.
10	MOD	Verify that the MOD is functioning properly.

10-4-3 Input Power Checks

10-4-3-1 Mains Cable Inspection

Table 10-7 Mains Cable Inspection

Step	Item	Description
1	Unplug Cord	Disconnect the mains cable from the wall outlet and from the system.
2	Mains Cable	Inspect the mains cable and its connectors for any damage.
3	Terminals	Verify that the LINE, NEUTRAL and GROUND wires are properly attached to the terminals, and that no strands may cause a short circuit.
4	Inlet Connector	Verify that the Inlet connector retainer is functional.

10-4-4 Cleaning

10-4-4-1 General Cleaning

Frequent and diligent cleaning of the Vivid S5 N or Vivid S6 N ultrasound unit reduces the risk of spreading infection from person to person, and also helps to maintain a clean working environment.

CAUTION **When performing Cleaning Procedures, to prevent the risk of system damage, always observe the following precautions:**

Use *only* cleaning materials and solutions recommended in the procedures described in Table 10-8 on page 10-11.

Do not use any solutions or products not listed in the Vivid S5 N or Vivid S6 N User Manual.

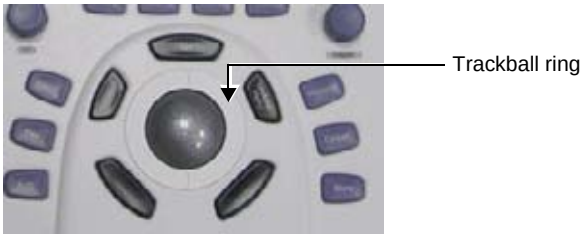
Do not spray any liquid directly onto the system covers, LCD Display or keyboard!

Do not allow any liquid to drip or seep into the system.

Prior to cleaning, turn OFF power to the system.

WARNING ***Table 10-8 on page 10-11 provides details for general cleaning.***
Follow all safety instructions for all chemicals used for cleaning or other purposes as instructed by manufacturer. Make sure you read the MSDS sections before usage!

Table 10-8 Vivid S5 N and Vivid S6 N Systems - General Cleaning

Step	Item	Description
1	Covers	On a weekly basis, moisten a soft, non-abrasive folded cloth or sponge with a mild, general purpose, non-abrasive soap and water solution. (**Do not use any solution containing abrasive powder or strong chemicals such as, acid or alkaline**). Squeeze excess liquid from the cloth/sponge, them wipe down the top, front, back and both sides of the unit. ***Do not spray any liquid directly onto the unit!*** Rinse the cloth/sponge with clean running water and wipe the unit surfaces again. Use a dry, soft, lint-free cloth to dry the unit surfaces. Wait for the unit surfaces to dry completely. Note: In the event that disinfection is required or any stubborn stains remain, remove them with a soft, dust-free cloth on which a small quantity of isopropyl rubbing alcohol has been absorbed, as described below for cleaning the Keyboard.
2	LCD Display	On a weekly basis, gently wipe the LCD Display with a dry, soft, lint-free non-abrasive folded cloth. Wipe or dust any stain gently with a soft, dry cloth. If the stain remains, moisten a soft, lint-free cloth with water or a 50-50 mixture of isopropyl alcohol and water that does not contain impurities. Wring out as much of the liquid as possible then wipe the LCD Display again. ***Do not let any liquid drip into the computer!***
3	Control Panel and Keyboard	**Control Panel:** On a weekly basis, moisten a soft, non-abrasive folded cloth or sponge with a mild, general purpose, non-abrasive soap and water solution or general purpose disinfectant. (**Do not use any solution containing abrasive powder or strong chemicals such as, acid or alkaline**). Squeeze excess liquid from the cloth/sponge, them wipe down the Control Panel. ***Do not spray any liquid directly onto the Control Panel!*** Rinse the cloth/sponge with clean running water and wipe the Control Panel again. Use a dry, soft, lint-free cloth to dry the Control Panel. Wait for the Control Panel surface to dry completely. **Keyboard:** Clean the keyboard as described (above) for cleaning the Control Panel. Note: In the event that disinfection is required or any stubborn stains remain, absorb a small quantity of isopropyl rubbing alcohol on a soft, dust-free cloth. Wipe the surface of the keycaps with the cloth, making sure that no liquid drips on or between the keys. Allow to dry. **Trackball:** Turn the trackball ring (see below) to loosen and remove it, then lift out the trackball.  Wipe the bowl clean using a **lint-free** cloth and isopropyl alcohol. Place the trackball back in the bowl and fasten securely with the trackball ring.
4	Probe Holders	Clean the probe holders with warm water and a damp cloth to remove all traces of gel (soaking may be required to remove excess gel).
5	MOD	Clean the drive head and media with the vendor-supplied cleaning kit. Advise the user to repeat this often, to prevent future problems. MOD disks must be stored away from dust and cigarette smoke. Do not use alcohol or benzene to clean the MOD cartridge.
6	DVD - CDRW Drive	Clean the drive head and media with the vendor-supplied cleaning kit. Advise the user to repeat this often, to prevent future problems. CDs must be stored away from dust and cigarette smoke. Do not use alcohol or benzene to clean the CD drive.
7	Peripherals	Clean the peripherals in accordance with the respective manufacturer's directions.

10-4-4-2 Air Filter Cleaning

Regular cleaning of the Vivid S5 N or Vivid S6 N scanner's air filter will ensure that the filter does not become clogged - this would otherwise cause the system to overheat and reduce system performance and reliability.

NOTE: It is recommended that the air filter cleaning procedure is performed once every 3 months (quarterly). However, the required frequency for air filter cleaning will vary in accordance with environmental conditions.

Table 10-9 Air Filter Cleaning

Step	Item	Description
1	Air Filter	Remove the left side cover from the system, as described in "Left Side Cover Removal Procedure" on page 8-6. Remove the air filter from the cover, as shown in Figure 8-6 on page 8-7. Clean the air filter as follows: shake it in an area away from the system, wash with a mild soapy solution, rinse, and air dry.
2	Air Filter	Install the clean air filter. Refer to the "Air Filter Replacement Procedure" on page 8-7 for air filter installation instructions.

NOTE: For convenience (or if the air filter is excessively dirty), replacement filters are available. Refer to Chapter 9 - Renewal Parts for the air filter replacement part number.

10-4-5 Physical Inspection

Table 10-10 Physical Checks

Step	Item	Description
1	Labeling	Verify that all system labeling is present and in readable condition.
2	Scratches and Dents	Inspect the system for dents, scratches or cracks.
3	Covers	Clean the Covers as described in Table 10-8 on page 10-11 Verify all covers are secured in place and are properly aligned with other covers. Replace any covers that are damaged.
4	LCD Display	Clean the LCD Display as described in Table 10-8 on page 10-11 Inspect the LCD Display for scratches and raster burns. Verify proper operation of Contrast and Brightness controls. For details, see "LCD Display Adjustment and Calibration" on page 3-67. Confirm that the LCD arm allows: • swivelling the screen to the *left* and to the *right* • folding the screen to the *locked* position • release and adjustment *backwards* and *forwards* • on Vivid S6 N systems, also confirm the LCD screen can be adjusted in the up/down positions.
5	Control Panel and Keyboard	Clean the Control Panel and Keyboard as described in Table 10-8 on page 10-11 Inspect the Control Panel and Keyboard. Note any damaged or missing items. (Replace faulty components, as required). Verify proper operation of Control Panel backlighting and TGC sliders. Verify ease of *up*/*down* movement and make sure that the upper console holds its set position when the handle is released and that there is no play on the mechanism. Check that the keyboard swivel mechanism allows release and rotation to the *left* and *right*.
6	Probe Holders	Clean the probe holders as described in Table 10-8 on page 10-11. Inspect the Probe Holders for cracks or damage.
7	Wheels	Check all four wheels and castors for wear. Check the brakes on each of the two front wheels. Make sure that pressing the brake locks the wheel, preventing it from swivelling or rolling and therefore stopping movement of the system. Verify that releasing the brakes allows free movement of the system.
9	MOD (if option installed)	Clean the drive head and media with the vendor-supplied cleaning kit. Advise the user to repeat this often, to prevent future problems. MOD disks must be stored away from dust and cigarette smoke. Do not use alcohol or benzene to clean the MOD cartridge.
10	DVD- CDRW Drive	Clean the drive head and media with the vendor-supplied cleaning kit. Advise the user to repeat this often, to prevent future problems. CDs must be stored away from dust and cigarette smoke. Do not use alcohol or benzene to clean the CD drive.
14	Cables and Connectors	Check all internal cable harnesses and connectors for wear, and secure connector seating. Pay special attention to probe strain or bend reliefs.
15	Power Cord	Check the power cord for cuts, loose hardware, tire marks, exposed insulation or other deterioration, and verify continuity. Tighten the clamps that secure the power cord to the unit and the outlet plug to the cord. Replace the power cord and clamp, as required.

Table 10-10 Physical Checks (cont'd)

Step	Item	Description
16	Shielding and Covers	Check to ensure that all EMI shielding, internal covers, air flow panels and screws are in place. Missing covers and hardware could cause EMI/RFI problems during scanning.
17	Peripherals	Check and clean the peripherals according to the manufacturer's directions. To prevent EMI or system overheating, dress the peripheral cables inside the peripheral cover.
18	External I/O	Check all connectors for damage and verify that the labeling is good.
19	Power and System Status Indicators	Check for proper operation of all Power and System Status Indicators.
20	Battery (Vivid S6 N systems)	Check that the battery is not damaged, does not leak, does not emit an odor, and is not deformed or discolored. Perform the Battery Parameters Test as described in "Battery Parameters Test" on page 7-103. Observe all warnings and cautions for battery handling, recharging, storing, and/or disposal, as listed in "Vivid S6 N Battery Safety" on page 1-14.

10-4-6 Optional Diagnostic Checks

To complete the periodic maintenance checks, perform the diagnostic tests as described in *Chapter 7* - Diagnostics/Troubleshooting.

- Review the system error log for any problems.
- Check the temperature log to see if there are any trends that could cause problems in the future.

Section 10-5
Probe Maintenance

WARNING ***Any evidence of wear on a probe indicates that it must not be used. Improper handling may easily damage ultrasound probes. See the Vivid S5 N or Vivid S6 N User Manual and also refer to the probe manufacturer's handling instructions, for more details.***

Failure to follow these precautions can result in serious injury and equipment damage. Failure to properly handle or maintain a probe may also void its warranty.

10-5-1 Probe Checks

Table 10-11 Probe Checks

Step	Item	Description
1	Probe Holder	Check there are no traces of gel on the probe holders. If any gel present, clean the probe holders with warm water and a damp cloth to remove all traces of gel (soaking may be required to remove excess gel).
2	Probes	Check all the probes for wear and tear on the lens, cable and connector. Look for bent pins on the connector and in the connector socket on the unit. Remove any dust from inside the connector sockets. Verify that the EMI fingers around the probe connector socket housing are intact. Check the probe locking mechanism and probe switch. Perform a visual check of transducer pins and connector sockets before connecting a probe. Verify that the system properly recognizes all probes.

10-5-2 Probe Handling

All Vivid S5 N and Vivid S6 N probes are designed and manufactured to provide trouble-free, reliable service. To ensure this, the correct handling of probes is important and the following points should be noted:

- Do not drop a probe or strike it against a hard surface, as this may damage the probe elements and the acoustic lens, or may crack the housing.
- Do not use a cracked or damaged probe. Any evidence of wear indicates the probe must *not* be used. Call your field service representative immediately for a replacement.
- Perform a visual check of the probe pins and system sockets before plugging in a probe
- Avoid pulling, pinching or kinking the probe cable, since a damaged cable may compromise the electrical safety of the probe.
- To avoid the risk of a probe accidentally falling, do not allow the probe cables to become entangled with, or to be caught in the wheels of the system.
- Protect the probe when moving the unit.
- Use a soft cloth and warm, soapy water to clean the probe.

NOTE: For detailed information on handling endocavity probes, refer to the appropriate supplementary instructions for each probe.

10-5-3 Basic Probe Care

The *Vivid S5 N and Vivid S6 N User Manual* and the individual probe manufacturers' handling cards provide a complete description of probe care, maintenance, cleaning and disinfection. Ensure that you are completely familiar with the proper care of GE probes.

WARNING ***Any evidence of wear on a probe indicates that it must not be used. Ultrasound probes can be easily damaged by improper handling. See the Vivid S5 N or Vivid S6 NUser Manual and also refer to the probe manufacturer's care cards, for more details.***

NOTE: Failure to follow these precautions can result in serious injury and equipment damage. Failure to properly handle or maintain a probe may also void its warranty.

Always perform a visual check of the probe pins and system sockets before plugging in a probe.

When handling probes, always observe the precautions listed in "Probe Handling" on page 10-15.

The TEE and Interoperative probes often have special usage considerations; always refer to the individual probe manufacturers' handling instructions/user manual.

10-5-4 Probe Cleaning

10-5-4-1 Basic Probe Cleaning

NOTE: For details on general probe cleaning, refer to the information provided in the Vivid S5 N or Vivid S6 N User Manual.

NOTE: For specific probe cleaning instructions, refer to the individual probe Users Manual (or care card supplied with the probe).

CAUTION **Failure to follow the prescribed cleaning or disinfection procedures will void the probe's warranty. DO NOT soak the probe or wipe the probe lens with any product not listed in the Vivid S5 N or Vivid S6 N User Manual. Doing so could result in irreparable damage to the probe and/ or system. Follow the care instructions supplied with the probe.**

CAUTION **To help protect yourself from blood-borne diseases when cleaning and handling probes, wear approved, non-allergic disposable gloves.**

WARNING **Always disinfect a defective probe before returning it to the manufacturer. Be sure to tag the probe as being disinfected.**

10-5-4-2 General Probe Cleaning Instructions

WARNING Do *not* clean or immerse probes using any of the following products:

- Acetone
- Ammonium chloride
- Alcohol, ethanol, isopropanol, or methanol
- Bleach
- Detergent
- Hydrogen peroxide
- Iodine
- Para-hydroxybenzoic acid
- Aloe vera, perfume, lanolin, or mineral oil

Do not soak or wipe the probe lens with any product listed above (see Warning). Doing so could result in irreparable damage to the probe. Follow the care instructions supplied with each probe. In order to disinfect or sterilize probes without damaging them:

- Use gas sterilization and legally marked, sterile, pyrogen-free probe sheaths on probes used for surgery.
- Use cold chemical sterilization suitable for plastic medical scanning devices.
- Do not immerse a probe beyond the ridge on its case.
- Avoid cleaning and storage temperatures over 60°C (140°F).

WARNING *Neurological procedures must NOT be performed on a patient with Creutzfield-Jacob disease because probes that have been used for such examinations cannot be adequately sterilized.*

WARNING *Neurological and intraoperative procedures must be performed with the use of legally marketed, sterile, pyrogen-free probe sheaths. Probes used during neurological surgery must NOT be sterilized with liquid chemical sterilants because of the possibility of neurotoxic residue remaining on the probe.*

10-5-4-2 General Probe Cleaning Instructions (cont'd)

10-5-4-2-1 Cleaning and Sterilizing Probes Used Externally

Table 10-12 Cleaning & Sterilizing Procedure for Probes Used Externally

Step	Description
1	To protect yourself from blood-borne diseases, wear approved, non-allergic disposable gloves.
2	Do not immerse the connector or its strain relief in solution. Use ultrasound probe cleaning towels. Wash the probe and probe cable in warm soap and water solution (below 80°F). Use only mild non-abrasive soap.
3	Follow the manufacturer's cold sterilization instructions to disinfect the probe, including concentration and soaking time; 10 minutes is a typical disinfecting period.
4	Follow step 3 for a much longer duration to sterilize the probe; 10 hours is a typical cold chemical sterilization duration.
5	When complete, thoroughly rinse the washed lens in clear water. Apply sterile distilled water for at least 60 seconds. Air dry.
6	Check the lens for cracking and the cable insulation for separation.
7	Store the probe in its carrying case.

10-5-4-2-2 Cleaning and Sterilizing Probes Used Internally

Table 10-13 Cleaning & Sterilizing Procedure for Probes (TEE) Used Internally

Step	Description
1	To protect yourself from blood-borne diseases, wear approved, non-allergic disposable gloves.
2	Do not immerse the connector or its strain relief in solution. Use ultrasound probe cleaning towels. Wash the probe and probe cable in warm soap and water solution (below 80°F). Use only mild non-abrasive soap.
3	Follow the manufacturer's cold sterilization instructions to disinfect the probe, including concentration and soaking time; 10 minutes is a typical disinfecting period.
4	Follow step 3 for a much longer duration to sterilize the probe; 10 hours is a typical cold chemical sterilization duration.
5	When complete, thoroughly rinse the washed lens in clear water. Apply sterile distilled water for at least 60 seconds. Air dry.
6	Check the lens for cracking and the cable insulation for separation.
7	Store the probe in its carrying case.

10-5-5 Returning and Shipping of Defective Probes

WARNING **Always disinfect a defective probe before returning it to the manufacturer. Be sure to tag the probe as being disinfected.**

CAUTION **To help protect yourself from blood-borne diseases when cleaning and handling probes, wear approved, non-allergic disposable gloves.**

Equipment being returned must be properly clean and free of blood and other potentially infectious contaminants.

GEMS policy states that body fluids must be properly removed from any part or equipment prior to shipment. GEMS employees, as well as customers, are responsible for ensuring that parts/equipment have been properly decontaminated prior to shipment. Under no circumstances should a part or equipment be shipped before being visibly clean and properly disinfected.

The purpose of the regulation is to protect employees in the transportation industry, as well as the persons who will receive and/or open the package.

NOTE: The US Department of Transportation (DOT) has ruled that "items that were saturated and/or dripping with human blood that are now caked with dried blood; or which were used or intended for use in patient care" are "regulated medical waste" for transportation purposes and must be transported as a hazardous material.

Section 10-6
Electrical Safety Tests

10-6-1 Safety Test Overview

The electrical safety tests in this section are based on and conform to NFPA 99 (For USA) and IEC 60601-1 Medical Equipment Safety Standards. They are intended for the electrical safety evaluation of cord-connected, electrically operated, patient care equipment. If additional information is needed, refer to the NFPA 99 (for USA) and IEC 60601-1 documents.

WARNING ***THE USER MUST ENSURE THAT THE SAFETY INSPECTIONS ARE PERFORMED AT LEAST EVERY 12 MONTHS ACCORDING TO THE REQUIREMENTS OF THE PATIENT SAFETY STANDARD IEC-EN 60601-1. ONLY TRAINED PERSONS ARE ALLOWED TO PERFORM THE ABOVE-MENTIONED SAFETY INSPECTIONS.***

CAUTION **To avoid the risk of electrical shock, the unit under test must not be connected to other electrical equipment. Remove all interconnecting cables and wires. The operator and patient must not come into contact with the unit while the tests are being performed.**

CAUTION **Possible risk of infection. Do not handle soiled or contaminated probes and other components that have been in patient contact. Follow appropriate cleaning and disinfecting procedures before handling the equipment.**

Test the system, peripherals and probes for current leakage.

WARNING ***EXCESSIVE CURRENT LEAKAGE CAN CAUSE FATAL INJURY.EXCESSIVE CURRENT LEAKAGE CAN INDICATE DEGRADATION OF INSULATION OR OTHER PART AND COULD POTENTIALLY CAUSE ELECTRICAL FAILURE. DO NOT USE PROBES OR EQUIPMENT THAT HAVE EXCESSIVE CURRENT LEAKAGE.***

To minimize the risk of a probe causing electrical shock, the customer should observe the following recommendations:

- Do not use a probe that is cracked or damaged in any way
- Check probe current leakage, as shown below:

Probe	Frequency for Checking
Surface	Once per year (or in accordance with QA program)
Endocavitary	Twice per year (or in accordance with QA program)
Any probe	Whenever damage is suspected

10-6-2 GE Current Leakage Limits

The following limits are summarized for NFPA 99 (for USA) and IEC 60601-1 Medical Equipment Safety Standards. These limits are GEMS standards and in some cases are lower than the above standards listed.

Table 10-14 Chassis Current Leakage Limits - Accessible Metal Surfaces

Country	Normal Condition	Open Ground	Reverse Polarity	Open Neutral
USA	N/A	0.3 mA	0.3 mA	N/A
Other	0.1 mA	0.5 mA	0.5 mA	0.5 mA

Table 10-15 Type BF Applied Part Current Leakage Limits - Non-Conductive (Floating) Surface and Cavity Probes

Country	Normal Condition	Open Ground	Reverse Polarity	Open Neutral	Mains Applied[a]
USA	0.05 mA	0.05 mA	0.05 mA	0.05 mA	N/A
Other	0.1 mA	0.5 mA	0.5 mA	0.5 mA	5.0 mA

a. Mains Applied is the Sink Leakage Test. In this test, mains (supply) voltage is supplied to the part or equipment to determine the amount of current that will pass (sink) to Ground if a patient comes into contact with the part.

Table 10-16 Type CF Applied Part Current Leakage Limits - Surgical Probes and ECG Connections

Country	Normal Condition	Open Ground	Reverse Polarity	Open Neutral	Mains Applied[a]
USA	0.01 mA	0.05mA	0.05 mA	N/A	0.025 mA
Other	0.01 mA	0.05 mA	0.05 mA	0.05 mA	0.05 mA

a. Mains Applied is the Sink Leakage Test. In this test, mains (supply) voltage is supplied to the part or equipment to determine the amount of current that will pass (sink) to Ground if a patient comes into contact with the part.

10-6-3 Outlet Test Wiring Arrangement - USA & Canada

Test all outlets in the area for proper grounding and wiring arrangement by plugging in the neon outlet tester and noting the combination of lights that are illuminated. Any problems found should be reported to the hospital immediately and the receptacle should not be used.

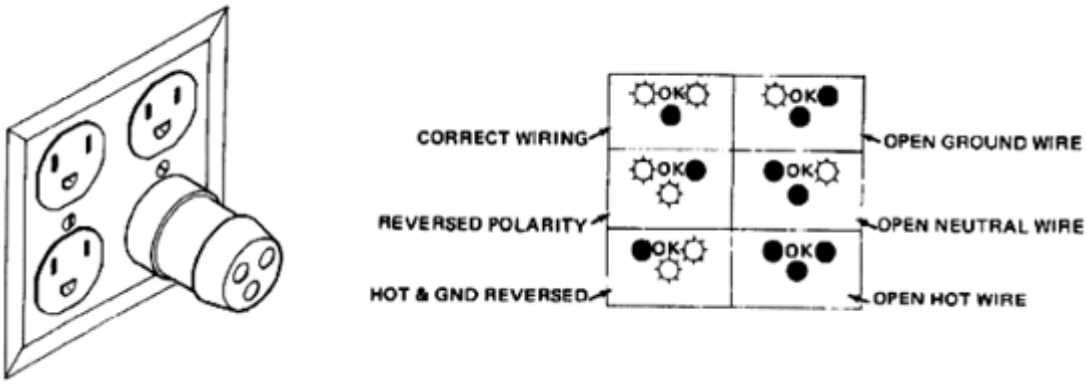


Figure 10-1 Typical Outlet Tester

NOTE: No outlet tester can detect the condition in which the Neutral (grounded supply) conductor and the Grounding (protective earth) conductor have been reversed. If later tests indicate high current leakages, this should be suspected as a possible cause and the outlet wiring should be visually inspected.

10-6-4 Grounding Continuity

CAUTION **Electric Shock Hazard!**
The patient or operator must not come into contact with the equipment during this test.

Measure the resistance between the third pin of the attachment plug and any exposed metal parts on the system. The Ground wire resistance should be less than **0.2** Ohms. Refer to the procedure in the IEC 601-1.1.

ACCESSIBLE METAL PARTS

such as:
a) Monitor Housing
b) Rear Panel Connector
c) Any Caster/Wheel support

Figure 10-2 Ground Continuity Test

10-6-4-1 Ground Continuity Testing - Generic Procedure

Follow these steps to test the Ground wire resistance:

1.) Turn the Vivid S5 N or Vivid S6 N unit OFF.
2.) Connect one of the Ohmmeter probes to the tested AC wall outlet (Ground pin).
3.) Using the other Ohmmeter probe, touch the exposed metal part of the Vivid S5 N or Vivid S6 N unit.
4) Set the meter **Function** switch to the **Resistance** position.
5) Measure and record the Ground wire resistance.
This should be less than 0.2 Ohms.

10-6-5 Chassis Current Leakage Test

10-6-5-1 Definition

This test measures the current that would flow in a grounded person who touched accessible metal parts of the bedside station, if the Ground wire should break. The test verifies the isolation of the power line from the chassis.

The meter is connected from accessible metal parts of the case to Ground. Measurements should be made with the unit ON and OFF, with the power line polarity Normal and Reversed. Record the highest reading.

DANGER **Electric Shock Hazard.**
When the meter's Ground switch is OPEN, *do not touch the unit!*

CAUTION Equipment damage possibility.
Never switch the polarity and the neutral status when the unit is powered ON. Be sure to turn the unit power OFF before switching them using the **Polarity** switch and/or the **Neutral** switch. Otherwise, the unit may be damaged.

10-6-5-2 Generic Procedure

The test verifies the isolation of the power line from the chassis. The testing meter is connected from accessible metal parts of the case to Ground. Measurements should be made with the unit ON and OFF, with the power line polarity Normal and Reversed. Record the highest reading of current.

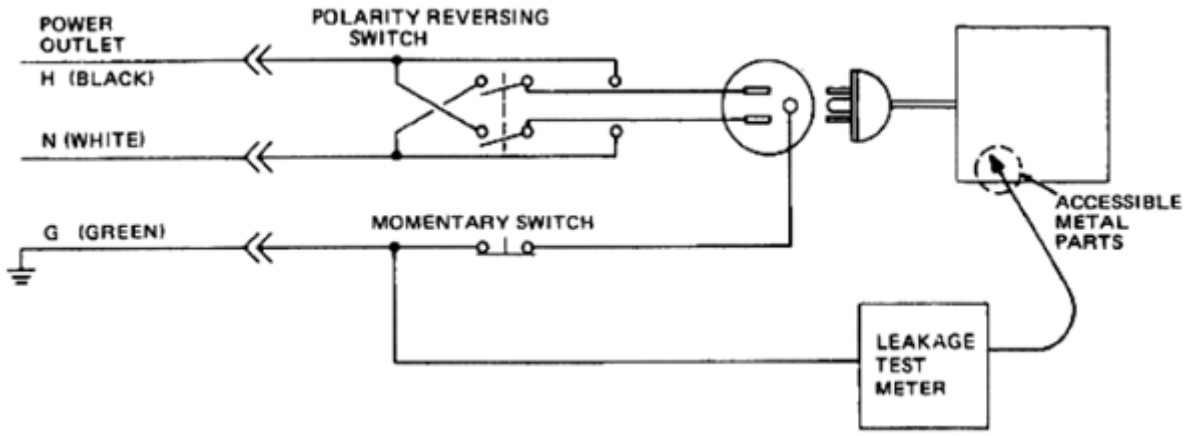


Figure 10-3 Set Up for Chassis Source Current Leakage, IEC 601-1 Clause 19 Continuous Current Leakage and Patient, Auxiliary Currents

When using the Microguard or a similar test instrument, its power plug may be inserted into the wall outlet and the equipment under test be plugged into the receptacle on the panel of the meter. This places the meter in the grounding conductor and the current flowing from the case to Ground will be indicated in any of the current ranges. The maximum allowable limit for chassis source leakage is shown in Table 10-14 on page 10-21.

10-6-5-3 Data Sheet for Chassis Source Current Leakage

The Chassis Source Current Leakage Test passes when all readings measure less than the values shown in Table 10-14. Record all data on the Vivid S5 N and Vivid S6 N System Inspection Certificate (see page 10-33).

Table 10-17 Typical Data Sheet for Chassis Source Current Leakage Test

Unit Power	Tester Polarity Switch	Tester Neutral or Ground Switch	Test 1 Probe Connector	Test 2 Caster Wheel	Test 3 LCD	Test 4 (Optional)	Test 5 (Optional)
Enter Name of tested peripheral here:							
ON	NORM	OPEN					
ON	NORM	CLOSED					
ON	REV	OPEN					
ON	REV	CLOSED					
OFF	NORM	OPEN					
OFF	NORM	CLOSED					
OFF	REV	OPEN					
OFF	REV	CLOSED					

10-6-6 Isolated Patient Lead (Source) Leakage – Lead-to-Ground

10-6-6-1 Definition

This test measures the current which would flow to Ground from any of the isolated ECG leads. The meter simulates a patient who is connected to the monitoring equipment and is grounded by touching some other grounded surface.

Measurements should be made with the Ground *open* and *closed*, with power line polarity *normal* and *reversed*, and with the ultrasound console OFF and ON. For each combination the operating controls, such as the lead switch, should be operated to find the worst case condition.

CAUTION Equipment damage possibility. To avoid damaging the unit, never switch the polarity and the neutral status when the unit is powered ON. Be sure to turn the unit power OFF before switching them, using the **Polarity** switch and/or the **Neutral** switch.

10-6-6-2 Generic Procedure

Measurements should be made with the Ground **Open** and **Closed**, with power line polarity **Normal** and **Reversed**, and with the Vivid S5 N or Vivid S6 N unit **ON** and **OFF**. For each combination, the operating controls (such as, the lead switch) should be operated to find the worst case condition.

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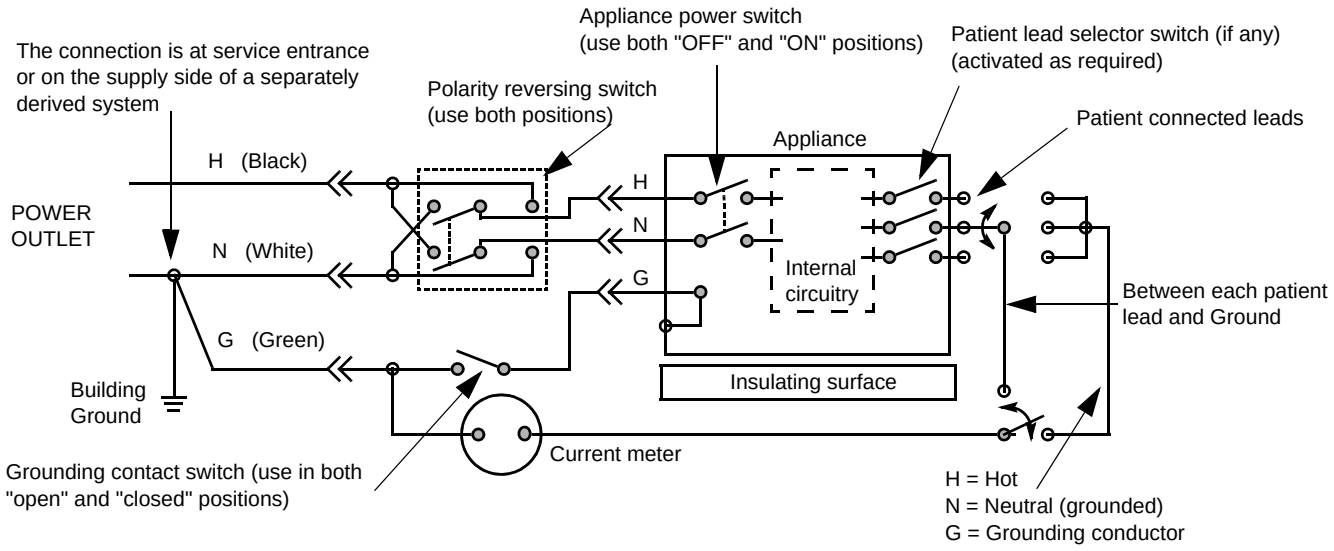
The connection is at service entrance or on the supply side of a separately derived system
Appliance power switch (use both "OFF" and "ON" positions)
Patient lead selector switch (if any) (activated as required)
Polarity reversing switch (use both positions)
Patient connected leads
Appliance
H (Black)
POWER OUTLET
N (White)
G (Green)
H
N
G
Internal circuitry
Between each patient lead and Ground
Building Ground
Insulating surface
Current meter
Grounding contact switch (use in both "open" and "closed" positions)
H = Hot
N = Neutral (grounded)
G = Grounding conductor

Figure 10-4 Test Circuit for Measuring Non-Isolated Patient Leads

10-6-7 Isolated Patient Lead (Source) Leakage – Lead-to-Lead

NOTE: Refer to the procedure in the IEC 60601-1.

10-6-8 Isolated Patient Lead (Sink) Leakage - Isolation Test

NOTE: Refer to the procedure in the IEC 60601-1.

CAUTION **Line voltage is applied to the ECG leads during this test. To avoid the risk of possible electric shock, the system being tested must not be touched by anyone (patient or operator), while the ISO TEST switch is depressed.**

NOTE: It is not necessary to test each lead individually, or power condition combinations, as required in previous tests.

10-6-8-1 Data Sheet for ECG Current Leakage

The test passes when all readings measure less than the values shown in the tables below. Record all data on the Vivid S5 N and Vivid S6 N System Inspection Certificate (see page 10-33).

Table 10-18 Maximum Allowance Limit for ECG Lead Leakage Test to Ground

	AC Power Source	Maximum Allowance Limit	
		GROUND OPEN	GROUND CLOSED
Patient Lead-to-Ground Current Leakage Test and Patient Lead-to-Lead Current Leakage Test	115V	10uA	10uA
	220/240V	500uA	10uA

Table 10-19 Maximum Allowance Limit for ECG Lead Isolation Sink Test

	AC Power Source	Maximum Allowance Limit
Patient Lead Isolation Current Test	115V	20uA
	220/240V	5mA

Table 10-20 Typical Data Sheet for ECG Lead-to-Lead Test

ECG Power	Tester Polarity Switch	Tester Ground Switch	Tester Lead Selector				
			RL	RA	LA	LL	C
ON	NORM	CLOSED					
ON	REVERSE	CLOSED					
ON	NORM	OPEN					
ON	REVERSE	OPEN					
OFF	NORM	CLOSED					
OFF	REVERSE	CLOSED					
OFF	NORM	OPEN					
OFF	REVERSE	OPEN					

10-6-9 Probe Current Leakage Test

10-6-9-1 Definition

This test measures the current that would flow to Ground (from any of the probes) through a patient who is being scanned, and who becomes grounded by touching some other grounded surface.

10-6-9-2 Generic Procedure

Measurements should be made with the Ground OPEN and CLOSED, with power line polarity *Normal* and *Reversed*, and with the unit OFF and ON. For each combination, the probe must be active to find the worst case condition.

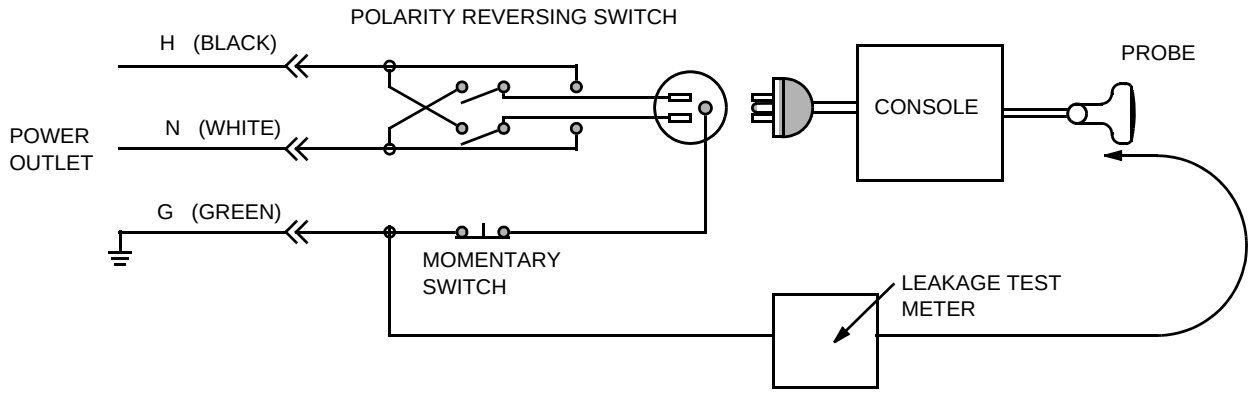

Figure 10-5 Set Up for Probe Current Leakage Test

NOTE: Each probe will have a certain amount of current leakage, depending on its design. Small variations in probe current leakages are normal from probe to probe. Other variations will result from differences in line voltage and test lead placement.

10-6-9-3 No Meter Probe Adapter Procedure

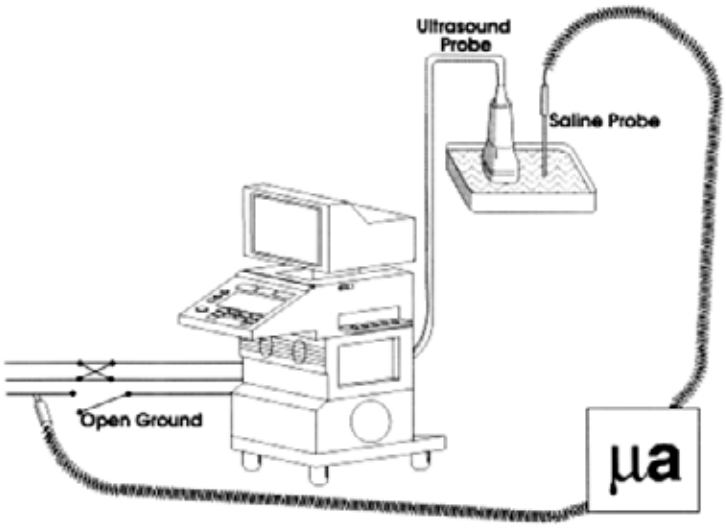

Figure 10-6 Check Without Probe Adapter

Follow these steps to test each transducer for current leakage.

1.) Turn the Vivid S5 N or Vivid S6 N unit OFF.
2.) Plug the unit into the test meter, and the meter into the tested AC wall outlet.
3.) Plug the external probe into the meter “EXTERNAL” connector.
4.) Set the meter's “FUNCTION” switch to EXTERNAL position.
5.) Connect the probe for test with the connector of the console.
6.) Add the saline probe and the imaging area of the probe into the saline bath.
7.) Turn unit power ON for the first part; turn it OFF for the second half.
8.) Depress the ISO TEST rocker switch and record the highest current reading.
9.) Follow the test conditions described in Table 10-21 for every transducer.
10.) Keep a record of the results with other hard copies of Preventive Maintenance data or corrective actions taken.

10-6-9-4 Data Sheet for Transducer Source Current Leakage

The test passes when all readings measure less than the values shown in Table 10-15 and Table 10-16. Record all data on the Vivid S5 N and Vivid S6 N System Inspection Certificate (see page 10-33).

CAUTION **When power to the unit is ON, *never* switch the Polarity and the status of Neutral . Be sure to turn OFF power to the unit before switching them, using the POLARITY switch and/or the NEUTRAL switch. *Failure to comply with this warning may cause damage to the unit!***

Table 10-21 Typical Data Sheet for Transducer Source Current Leakage Test

Transducer Tested:			
Unit Power	**Tester Power POLARITY Switch**	**Tester GROUND or NEUTRAL Switch**	**Measurement**
ON	NORM	OPEN	
ON	NORM	CLOSED	
ON	REV	OPEN	
ON	REV	CLOSED	
OFF	NORM	OPEN	
OFF	NORM	CLOSED	
OFF	REV	OPEN	
OFF	REV	CLOSED	

Section 10-7
Excessive Current Leakage

10-7-1 Possible Causes of Excessive Current Leakage

10-7-1-1 Chassis Fails

Check the Ground on the power cord and plug for continuity. Ensure the Ground is not broken, frayed, or intermittent. Replace any defective part.

Tighten all Grounds. Ensure star washers are under all Ground studs.

Inspect wiring for bad crimps, poor connections, or damage.

Test the wall outlet; verify it is grounded and is free of other wiring abnormalities. Notify the user or owner to correct any deviations. As a work around, check the other outlets to see if they could be used instead.

NOTE: No outlet tester can detect the condition where the white neutral wire and the green grounding wire are reversed. If later tests indicate high current leakages, this should be suspected as a possible cause and the outlet wiring should be visually inspected.

10-7-1-2 Probe Fails

Test the probe in another connector to verify if the fault lies with the probe or the scanner.

NOTE: Each probe will have some amount of leakage, depending on its design. Small variations in probe current leakages are normal from probe to probe. Other variations will result from differences in line voltage and test lead placement. The maximum allowable current leakage for body surface contact probes differs from that of inter-cavity probes. Be sure to enter the correct probe type in the appropriate space on the check list.

If excessive current leakage is slot dependent, inspect the system connector for bent pins, poor connections, and Ground continuity.

If the problem remains with the probe, replace the probe.

10-7-1-3 Peripheral Fails

Tighten all Grounds. Ensure star washers are under all Ground studs.

Inspect wiring for bad crimps, poor connections, or damage.

10-7-1-4 Still Fails

If all else fails, begin isolation by removing the probes, external peripherals, then the on-board peripherals (one at a time) while monitoring the current leakage measurement.

10-7-1-5 New Unit

If the current leakage measurement tests fail on a new unit and if the situation cannot be corrected, submit a Safety Failure Report to document the system problem. Remove the unit from operation.

10-7-1-6 ECG Fails

Inspect cables for damage or poor connections.

Section 10-8
Vivid S5 N and Vivid S6 N Inspection Certificates

Vivid S5 N and Vivid S6 N System Inspection Certificate

Customer Name:		System ID:	Dispatch Number / Date Performed:	Warranty/Contract/HBS
System Type		Model Number:	Serial Number:	Manufacture Date:
Probe 1:	Frequency:	Scan Format*:	Model Number:	Serial Number:
Probe 2:	Frequency:	Scan Format*:	Model Number:	Serial Number:
Probe 3:	Frequency:	Scan Format*:	Model Number:	Serial Number:
Probe 4:	Frequency:	Scan Format*:	Model Number:	Serial Number:
Probe 5:	Frequency:	Scan Format*:	Model Number:	Serial Number:
Probe 6:	Frequency:	Scan Format*:	Model Number:	Serial Number:
Probe 7:	Frequency:	Scan Format*:	Model Number:	Serial Number:
Probe 8:	Frequency:	Scan Format*:	Model Number:	Serial Number:
Probe 9:	Frequency:	Scan Format*:	Model Number:	Serial Number:

*Scan Format: Phased Array, Linear Array, Curved Array, Mechanical Array, or other

Functional Checks (if applicable)	**OK?** or **N/A**
B-Mode (2D) Function	
Doppler Mode Function	
CF-Mode Function	
M-Mode Function	
Applicable Software Options	
Applicable Hardware Options	
Control Panel	
Monitor	
Measurement Accuracy	
GE-approved Peripherals	

Physical Inspection and Cleaning (if applicable)	**Inspect**	**Clean**
Console		
Monitor		
Touch Panel		
Air Filter		
Probe Holders		
External I/O		
Wheels, Brakes & Swivel Locks		
Cables and Connectors		
GE-approved Peripherals (VCR, CD-RW, MOD, Printers)		

Comments:

Vivid S5 N and Vivid S6 N Electrical Safety Inspection Certificate

Electrical Test Performed	Max Value Allowed	Value Measured	OK?	Comments
Outlet (correct Ground & wiring config.)				
System Ground Continuity				
Chassis Source Current Leakage - Probe				
Chassis Source Current Leakage - Caster				
Chassis Source Current Leakage - LCD				
Patient Lead Source Leakage (Lead-to-Ground)				
Patient Lead Source Leakage (Lead-to-Lead)				
Patient Lead Source Leakage (Isolation)				
Peripheral 1 Current Leakage				
Peripheral 1 Ground Continuity				
Peripheral 2 Current Leakage				
Peripheral 2 Ground Continuity				
Peripheral 3 Current Leakage				
Peripheral 3 Ground Continuity				
PROBES				
Probe Number (from page 10-33)	**Max Value Allowed**	**Max Value Measured**	**OK?**	**Comments**
Probe 1:				
Probe 2:				
Probe 3:				
Probe 4:				
Probe 5:				
Probe 6:				
Probe 7:				
Probe 8:				
Probe 9:				

Final Check: All system covers are in place. The Vivid S5 N or Vivid S6 N system scans with all probes, as expected.

Accepted by:

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